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The Commonwealth of Massachusetts

ANNUAL REPORT

OF THE

METROPOLITAN DISTRICT COMMISSION

FOR THE YEAR ENDING NOVEMBER 30, 1930

PUBLICATION OF THIS DOCUMENT APPROVED BY THE COMMISSION ON ADMINISTRATION AND FINANCE

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REPORT OF THE METROPOLITAN DISTRICT COMMISSION

To the Honorable Senate and House of Representatives of the Commonwealth of Massachusetts in General Court assembled.

The Metropolitan District Commissioner has already presented to your Honorable Body an abstract of the account of the receipts, expenditures, disbursements and liabilities of the Metropolitan District Commission for the fiscal year ending on November 30, 1930, and now, in accordance with the provisions of section 100 of chapter 92 of the General Laws, presents a detailed statement of its doings for the calendar year ending on December 31, 1930.

ELEVENTH ANNUAL REPORT

I. ORGANIZATION AND ADMINISTRATION

Commission, Officers and Employees

The term of office of George B. Wason expired on November 30, 1930, and he was reappointed for the term of five years next succeeding. The membership of the Commission has consequently remained as in the preceding year: Davis B. Keniston, Commissioner, Frank A. Bayrd, George B. Wason, William F. Rogers and Charles H. J. Kimball, Associate Commissioners.

William E. Whittaker has continued as Secretary of the Commission and the following as Directors and Chief Engineers: of Park Engineering, Edwin H. Rogers; of the Sewerage Division, Frederick D. Smith; of the Water Division, William E. Foss.

The maximum number of employees during the year was 1,687, divided as follows: general offices, 33; parks, 1,002; water, 401; sewerage, 251.

II. GENERAL FINANCIAL STATEMENT

Year ending November 30, 1930

Expended for construction	$1,471,601.97
Expenditures, miscellaneous	421,459.49
Expenditures for maintenance	4,129,218.47
Total expenditures	6,022,279.93
Unexpended balance, maintenance appropriations	889,626.43
Serial bonds and notes issued	1,250,000.00
Serial bonds, sinking fund bonds and notes paid	7,378,687.50
Decrease in sinking funds	4,266,991.34
Decrease in net debt	1,861,696.16

On November 30, 1930

Net debt	$30,683,473.20

III. CONSTRUCTION

The injunction against proceeding with the work upon the Malden, Everett and Revere drainage channel, which has been pending before the Supreme Court since July 28, 1926, was dissolved on February 6, 1930. Construction started in May and was substantially completed during the year.

In the New Neponset Valley Sewer extension to the towns of Canton, Norwood, Stoughton and Walpole, Sections 107 and 108, 7,348 feet in length, were completed; construction continued upon Section 109, 4,450 feet in length and contracts were let for the construction of seven new sections, from 110 to 116, both inclusive, 36,830 feet in length. The remaining five upper sections in Norwood and Canton will be let early in the coming year.

By Chapter 419 of the Acts of 1930 the Town of Weymouth was added to the South Metropolitan Sewerage District, subject to the acceptance of the act by the town meeting members not later than May 1, 1931. During

the year plans and surveys have been under way for an additional line with pumping station to serve the towns of Braintree and Weymouth and the Adams Shore section of Quincy.

A Venturi meter with Hersey detector meter has been installed on the connection with the town of Brookline water main on Fisher Avenue.

An additional section of the new Weston Aqueduct supply main in Western Avenue and Market Street, Brighton, of 60-inch welded steel pipe 5,400 feet in length, was laid during the year.

The new Northern High-service pipe line has been extended from Broadway, Revere to Winthrop and East Boston. This consists of 5,483 feet of 24-inch cast iron pipe from Broadway to Ocean Avenue, Revere, of 12,208 feet of 20-inch cast iron pipe from Ocean Avenue to the Revere-Winthrop line, and of 1,212 feet of 16-inch cast iron pipe from the Revere-Winthrop line to the East Boston-Revere line. This work was all completed during the year except some refilling of trench in the section from Ocean Avenue to the East Boston-Revere line.

Construction of West Roxbury Parkway from Newton Street to Hammond Street, Brookline, of Lynn Fells Parkway from Bellevue Avenue, Melrose, to the Newburyport Turnpike, Saugus, the relocation of a portion of Hillside Street, Milton, easterly from the Blue Hill River Road to Hoosicwhisick Pond entrance, and a change of alignment of a section of Administration Road easterly from Sassamon Road, Blue Hills Reservation, work upon which was started in 1929, were all completed during the first half of the year.

East Milton Street from Hyde Park Avenue easterly to near the Neponset River, Hyde Park, was completed during the year.

The reconstruction of Forest and Main streets, Medford and Stoneham into a four-lane, dual-type roadway with some changes in alignment and grade was substantially completed by the end of the year.

A traffic circle has been installed at the junction of Revere Beach Parkway and Middlesex Fells Parkway.

Jerome Street to Harvard Avenue in the Mystic Valley Parkway has been constructed with sidewalk and planting space.

South Border Road from Fellsway West to the Winchester line and Wyoming Avenue, Stoneham, have been reconstructed with some changes in alignment and grade.

Embankment Road from Beacon Street to Charles Street, Boston, and Memorial Drive from Hingham Street to River Street and from Boylston Street to Ash Street, Cambridge, have been resurfaced with sheet asphalt pavement on a concrete base with sidewalk, grading and edging.

Sidewalks were built on West Roxbury Parkway between Centre Street and Weld Street and from Centre Street to Washington Street and along the parkway to Pelton Street.

The roadway of Pilgrim Boulevard from Furnace Brook Parkway to Sea Street, Quincy, was constructed sufficiently to open to travel and will be completed early in the coming year.

The grading of the southerly slope of the Bunker Hill Monument grounds was completed and new steps and walks installed.

IV. PARKS AND RESERVATIONS

The usual work of maintenance and upkeep of parks, reservations and boulevards has been continued during the year.

The various observances by the different municipalities of the Tercentenary Anniversary resulted in an unusually large attendance and use of the various reservations and parkways. The more important features of the celebration with which the department was directly concerned were the League of Amateur Driving Clubs meet which was held at the Speedway in August, the National Association of Amateur Oarsmen Regatta on the Charles River Basin in August and the American Legion convention in October.

One hundred and fifty band concerts were given during the summer

months in the various parks and reservations at a cost of $24,719.55. The Symphony concerts were again conducted on the Esplanade for six weeks during July and August. As in the previous year these were under the direction of Arthur Fiedler and were supported by public subscription without cost to the District except for the erection of the shell and stage and police supervision. The attendance was even larger and more appreciative than in the previous year.

Plans for the replacement of the Nantasket Beach bath house, destroyed by fire on Thanksgiving Day, 1929, were prepared and approved early in the year, the contract for construction awarded and the structure completed and ready for use for the bathing season. The new building is of attractive stucco construction, of fireproof material throughout including the locker facilities. It provides for 50 per cent more lockers and will allow for the accommodation of many more bathers. The new building was relocated at the northerly end of the reservation more convenient to the users and to the service buildings and will allow a larger parking area at the southerly end of the reservation for those using the beach and not desiring the bath house facilities.

The public nine-hole golf course at Riverside was completed and opened for use May 1. A locker building was constructed and ready for use, containing two hundred and sixty-nine lockers. The course was given an appreciative use by the public. Over 21,000 rounds were played during the golf season.

The formal layout of the Recreation grounds at Hoosicwhicisk Pond in the Blue Hills Reservation was completed. A new refectory building with concession and waiting room was built in the centre of the area.

Two small bath houses have been built on the Charles River, one near the Speedway and the other near the Boston-Newton line.

The six acres in Dedham near the Spring Street bridge were graded, loamed and seeded.

The areas on both sides of Memorial Drive between Brookline and Magazine streets, about twelve acres in extent, have been filled to grade, loamed and seeded and trees planted.

The bank of the river along the new section of Charles River Road between Cottage Farm Bridge and Cambridge Street was loamed and seeded and the area between the roadway and the railroad was loamed and seeded and a woven wire fence built along the property line.

At Revere the police station has been thoroughly cleaned, renovated and repainted; a new sidewalk built on the easterly side of Eliot Circle and a new storage yard built in the Ocean Avenue yard. The curbstone on the ocean side between Revere Street and Northern Circle has been lowered to accommodate the parking of 750 automobiles and to avoid traffic congestion. About 1,000 feet of concrete walk was built at Nahant opposite the bath house and five drinking fountains installed.

At Middlesex Fells an addition has been made to the garage and some improvements to the buildings for the Zoo. Quite an area of marsh land adjoining the Mystic Valley Parkway in Medford was planted with trees and shrubs.

Alewife Brook Parkway from Concord Avenue to Massachusetts Avenue, Cambridge, was completed by the Public Works Department in July and turned over to the Commission for maintenance.

In the Charles River Upper Division a steeple chase was built at the Speedway and the marsh area between Soldiers Field Road and the Charles River has been cleared and partially filled and graded.

In Blue Hills Reservation about 25 miles of bridle paths have been rebuilt and repaired.

At Nantasket the merry-go-round building, square building and roller coaster building were torn down to make room for the new bath house. The remains of the old bath house were torn down and removed and the area graded and added to the parking space. Some improvements and changes have been made in the hotel and restaurant buildings.

To aid in the unemployment situation a number of extra laborers were used early in the year and substantial areas in the Middlesex Fells, Hammond Woods and Blue Hills were cleared of dead wood, brush and sprout growth.

V. POLICE

The permanent police force was increased during the year by the addition of one sergeant and nine patrolmen. The force at the end of the year consisted of one Captain and Executive Officer, 5 captains, 5 lieutenants, 1 lieutenant inspector, 1 detective sergeant, 17 sergeants, 158 patrolmen, 1 policewoman and 1 call officer, a total of 190.

Edward M. Woods has continued to serve as Captain and Executive Officer. Changes during the year have been as follows: 4 officers have been retired on pensions; 2 officers have died; 2 officers have resigned; 1 officer has been promoted to sergeant and 17 new officers have been appointed. A temporary force of 22 patrolmen and one policewoman were added to the force to serve during the summer season.

During the year 5,690 complaints were handled by the department before the courts, resulting in 5,402 convictions. The men in the department performed 10.069 hours of extra duty without extra compensation in connection with the band concerts, regattas, football games, races and the various conventions and celebrations occasioned by the Tercentenary observances. Ten members of the force were commended by the Commission for meritorious conduct.

VI. CHARLES RIVER BASIN

In accordance with the provisions of Chapter 371 of 1929, plans and specifications with estimates of cost for the improvement of the Charles River Basin were prepared and a hearing held which was well attended. No substantial objections were raised to the plans as shown. The estimated cost of the work on the Basin as well as the several parkway projects also authorized exceed the funds provided and a report accordingly has been filed with the Legislature for such action as it may determine.

VII. OFFICE BUILDING

The office building for the Metropolitan District activities authorized by Chapter 362 of 1929 has been substantially completed during the year and the forces of this Commission and the Metropolitan District Water Supply Commission moved to their new quarters during the latter part of December. The location obtained is at the corner of Somerset and Allston streets. The building is of modern fire-proof construction with nine floors and a basement with about 5,000 square feet of usable space to a floor, or a total of 45,000 square feet. The Metropolitan activities have been allotted five and one-half floors and the remaining space is available for other state departments.

VIII. RAINFALL AND CONSUMPTION OF WATER

The rainfall and yield of the watersheds has been the lowest on record, being only about 50 per cent of the average during the period since records have been kept. Wachusett Reservoir filled only to within 19 feet of the high-water line and was drawn down to below elevation 355 at the end of the year, leaving only 23,260 million gallons in storage.

During the year 49,792,038,000 gallons of water were furnished to the 18 municipalities regularly supplied, equivalent to an average daily consumption of 136,416,500 gallons, a decrease of about 500,000 gallons; and for the population supplied of 1,389,610 gallons at the rate of 98.2 gallons per capita, a decrease of 1 gallon per capita.

IX. TERCENTENARY EXPOSITION

As a part of the State's observance of the Tercentenary celebration this Department with the other departments of the State presented an exhibit showing its activities at the Eastern States Exposition Grounds in Spring-

field from September 14 to 20 and at the Commonwealth Armory in Boston from September 29 to October 11.

The exhibit included maps, plans and pictures of the different metropolitan systems and works with airplane views and moving pictures, samples and models of typical structures, police equipment, life-saving apparatus, various kinds of machinery used in the maintenance of the systems and a few animals from the zoo.

X. SPECIAL INVESTIGATION

In accordance with the provisions of Chapter 52 of the Resolves of 1930 the Commission inquired into the subject-matter of current house document numbered 898, relative to the laying out and construction by the Commission of a parkway or boulevard along the East Boston waterfront, reporting its findings and recommendations, with estimate of cost.

XI. OTHER REPORTS

The reports of the Directors of Park Engineering, Water and Sewerage, with tables, statistics and financial statements, are hereby appended.

Respectfully submitted,

DAVIS B. KENISTON,
Metropolitan District Commissioner.

February 28, 1931.

REPORT OF THE DIRECTOR AND CHIEF ENGINEER OF PARK ENGINEERING

Hon. Davis B. Keniston, *Commissioner, Metropolitan District Commission.*

Dear Sir: The following report is submitted of the work done under the direction and supervision of the engineering department of the parks division during the year ending November 30, 1930.

Organization

The engineering force has averaged as follows: one director of park engineering, one associate civil engineer, one superintendent of locks and drawbridges, one supervisor of machinery and equipment, six assistant civil engineers, ten junior civil engineers, one inspector of construction, eight senior engineering aids, fifteen junior engineering aids, one foreman of garage and chauffeur, four stenographers, one plan clerk and forty-eight lock and drawbridge assistants, mechanicians, operators and helpers.

All construction work and the general direction and supervision of all maintenance and repairs of parkways and boulevards, bridges, buildings and structures in the various park divisions and the operation of the various drawbridges and locks is in charge of the engineering department.

Construction and Maintenance Work

During the year plans and specifications have been prepared and construction supervised on the following work done by contract or by the maintenance forces of the various divisions:

Constructing Pilgrim Boulevard from Furnace Brook Parkway to Sea Street, Quincy.

Reconstruction of Embankment Road, Beacon Street to Charles Street, Boston, with sheet asphalt pavement on concrete base, resetting edgestone and resurfacing sidewalks.

Resurfacing Memorial Drive, Hingham Street to River Street, Cambridge, with sheet asphalt on concrete base, resetting edgestone and resurfacing sidewalks.

Rebuilding steps and walks at Bunker Hill Monument, southerly approach, Charlestown.

Grading southerly slope and other improvements on the grounds at Bunker Hill Monument, Charlestown.

Drainage improvements, canal, culverts and tide gates Malden, Everett and Revere, from Lynn Street to Pines River, authorized by chapter 456 of the acts of 1924.

Construction of East Milton Street, Hyde Park Avenue, easterly to near Neponset River, Boston (Hyde Park District).

Construction of Forest and Main Streets, Medford and Stoneham, with cement concrete and bituminous macadam dual type roadway.

Reconstruction of South Border Road, Medford and Winchester, from Fellsway West to near city and town boundary.

Reconstruction of Hillside Street, Milton, at Hoosicwhisick Pond.

Reconstruction of Wyoming Avenue, Stoneham.

Reconstruction of Memorial Drive, Boylston Street to Ash Street, Cambridge, with sheet asphalt pavement on concrete base and sidewalk grading.

Construction of traffic circle, Middlesex Fells and Revere Beach Parkways.

Drainage in Blue Hills Parkway from Neponset River to near Brook Road in conjunction with town of Milton.

Construction of bath houses on the Brighton side of the Charles River basin at the Speedway and at Faneuil.

Construction of chain link fence, Soldiers Field Road, Boston (Brighton District) from Cambridge Street to the Cottage Farm Bridge.

Constructing cement concrete walks on portion of Lynn Fells Parkway, Melrose, between Green Street and Bellevue Avenue.

Grading, loaming and constructing walks on 6.23 acres of land in Dedham, on Riverside Road from Bridge Street to Vine Rock Street along the Charles River.

Grading, loaming, and planting about 12 acres of land on both sides of Memorial Drive from Cottage Farm bridge to Magazine Street.

Regrading recreation grounds and slopes and building concrete steps on northerly side of Houghton's Pond, Milton.

Repairing and sealing sections of roadway of Dedham Parkway from Stony Brook Reservation to Mother Brook.

Constructing roadway, sidewalk and planting space, Mystic Valley Parkway, Jerome Street to Harvard Avenue.

Repairing and sealing Administration Road from Furnace Brook Parkway to Randolph Avenue.

Filling has been in progress from Newton Street to Heath Street, Hammond Pond Parkway.

Sidewalks, portion of Winthrop Shore Reservation and Nahant Beach Parkway.

Sidewalks, West Roxbury Parkway, Pelton Street to Weld Street.

A new decking was placed on the bridge on the Old Colony Parkway over the New York, New Haven & Hartford railroad tracks near Atlantic depot. This decking consisted of a wooden plank floor with a Durax granite block pavement. New floor stringers were installed by the railroad company.

The steel work of the Winthrop Shore bridge was extensively repaired and a new wooden floor system with asphalt plank pavement was constructed.

The steel work of Harvard Bridge was painted and miscellaneous repairs made to the floor and the pavement.

The stringers, floor and pavement of Wellington Bridge were repaired and miscellaneous repairs made to the other bridges on the parks system.

Filling beside Mt. Auburn Street, Cambridge, as part of the Charles River Basin Improvements, authorized by chapter 371 of the acts of 1929.

Filling beside Bay State Road, Boston, as part of the Charles River Basin Improvements.

Of the contracts let during 1929 on which work had been in progress during the year, four were not completed until the summer of 1930, as follows:

Construction of West Roxbury Parkway, Newton Street to Hammond Street, Brookline.

Construction of Lynn Fells Parkway, Bellevue Avenue, Melrose, to Newburyport Turnpike, Saugus.

Relocating, grading and surfacing Hillside Street, Milton, easterly from Blue Hill River Road.

Change in alignment of Administration Road easterly from Sassamon Road, Blue Hills Reservation, Quincy.

Plans, Studies and Estimates

Surveys, plans, studies and estimates have been made as follows:

Construction of Fellsway East Extension from Fellsway East to Lynn Fells Parkway, and of Bold Knob Road, Stony Brook Reservation, from Turtle Pond Road to Gordon Avenue entrance.

Hammond Pond Parkway, Hammond Pond to Beacon Street.

Traffic Circle, Forest Street and South Border Road, Medford.

Taking of land in Brookline for Hammond Pond Parkway on the southerly side of Heath Street.

Plan of taking, Brookline and Newton, for Hammond Pond Parkway, Heath Street to Boylston Street.

Plan of conveyance of land on the northerly side of Revere Beach Parkway, easterly from Tudor Street, Everett.

Taking of land along East Milton Street easterly from Walcott Square to near Neponset River, Hyde Park District, Boston.

Taking from city of Medford, land on the easterly side of Forest Street, northerly from Parkway Road, Medford, Middlesex Fells Reservation.

Mystic Valley Parkway, Arlington, plan of taking, Lower Mystic Lake to Lake Shore Drive.

Lynn Fells Parkway, Melrose, plan of exchange of lands between James Caldwell and the Commonwealth of Massachusetts and conveyance to C. H. Everson.

Hillside Street, Canton, Milton town line to Blue Hill River Road, plan of street layout to be conveyed to Commonwealth of Massachusetts for care and control.

Plan of taking at the corner of Somerset Street and Allston Street, Boston (Somerset Schoolhouse lot for Metropolitan District Commission building).

Granite Street near Braintree-Quincy line to Purgatory Road, south of Administration Road, Quincy and Braintree, plan of taking from Guerrino Gianinni.

Lynn Fells Parkway at junction with Albert Road, Larchmont Road and Lincoln Street, Melrose, plan of takings from Chester Patten.

On the Charles River Basin inprovement work authorized by chapter 371, acts of 1929, the following work was done:

Borings were taken over the whole area of the basin from the dam to Cottage Farm Bridge to determine the character of the material underlying the basin.

Detailed cross sections were taken from the dam to Cottage Farm Bridge along the whole length of the proposed embankment on the Boston side.

Surveys were made of the existing drains and sewers and other physical conditions.

Detailed estimates were made for the construction of the proposed embankment and marginal conduit overflows from the dam to Cottage Farm Bridge.

General plans were prepared showing the proposed development of the widening of the proposed embankment.

Detailed studies were made to determine the location of the new shore line, proposed lagoons and other features of the development.

Detailed surveys and preliminary plans were made for the extension of Memorial Drive alongside Mt. Auburn Street and the Cambridge Hospital to Fresh Pond Parkway.

Preliminary studies were made of the underpass under Memorial Drive at the northerly end of Harvard Bridge.

Soundings were taken in the basin and preliminary plans and estimates made of the extension of Soldiers Field Road from Arsenal Street to North Beacon Street along the property of the Butcher's Slaughtering and Melting Association.

Surveys and plans were made for the construction of Nonantum Road from Hyde Brook in Newton to Water Street in Watertown, including plans for the proposed taking.

Plan of taking was made of land of the Trustees of Boston University on Bay State Road.

Lighting of Parkways and Boulevards

New parkway lighting installations have been completed and contracts for the operation thereof have been made as follows:

Pilgrim Boulevard, Blacks Creek Bridge to Sea Street.

Embankment Road, Charles Street to Beacon Street.

Lynn Fells Parkway Extension, Melrose, Bellevue Street to Bellevue Golf Club property.

Middlesex Fells Reservation, Forest and Main Streets.

Mystic Valley Parkway, Mt. Auburn Street to Mystic Avenue.

Middlesex Fells Parkway, traffic circle at the junction with Revere Beach Parkway.

East Milton Street, Hyde Park district of Boston.

Permits

Two hundred and ninety-nine permits were issued for driveway entrances and miscellaneous purposes and one hundred and twenty-eight orders concerning restrictions were issued and reported upon. This division has furnished the supervision of all work with regard to permits and has reported on building operations where violations of restrictions might be involved.

Ice Breaking in Basin

The work of breaking ice in the channels of the Charles River Basin below Longfellow Bridge and in Broad and Lechmere Canals for the season of 1929 and 1930 was done by contract with Earle A. Starrett. The contract cost was $5,000.00.

Financial

The cost of engineering salaries and expenses was as follows:

Construction:		
Salaries	$68,728.78	
Expenses	4,982.99	
		$73,711.77
Maintenance:		
Salaries	$61,994.40	
Expenses	3,663.70	
		65,658.10
Total		$139,369.87

Tables 1 to 9, inclusive, of statistics relating to the parks division are appended.

Respectfully submitted,

Edwin H. Rogers,

Director of Park Engineering.

TABLE 1 — The following is a record of the traffic through locks and drawbridges during the year:

Charles River Dam, Locks, and Drawbridges

Number of openings of locks	3,517
Number of vessels	4,156
Number of boats	2,310
Lumber (feet B.M.)	1,907,098
Coal (tons)	256,411
Oil (bbls.)	530,400
Piling (pieces)	620
Sand (tons)	245,895
Gravel (tons)	119,360
Granite (tons)	2,240
Miscellaneous (tons)	400

There were 2,241 highway drawbridge openings.

Cradock Bridge Lock

Number of openings	162
Number of boats	183
Number of boats over rollway	240

Neponset Bridge

Number of openings	306
Number of vessels	470
Coal (tons)	39,637
Lumber (feet B. M.)	1,409,000

Dorchester Bay Bridge

Number of openings	430
Number of vessels	669
Oil (bbls.)	222,800

Malden River Bridge

Number of openings	206
Number of vessels	333

Saugus River Bridge

Number of openings	322
Number of vessels	486

Wellington Bridge

Number of openings	86
Number of vessels	128

TABLE 4 — *Lengths of Roads and Bridle Paths in Reservations not open to Motor Vehicles*

	Miles
Blue Hills Reservation	27.08
Middlesex Fells Reservation	14.55
Stony Brook Reservation	1.60
Beaver Brook Reservation	.22
Charles River Reservation	.89
Total	44.34

TABLE 5 — *Electric Street Lights on Parkways and Reservations*

	Lights
Alewife Brook Parkway (24–600 c.p., 1–1500 c.p.)	25
Blue Hills Parkway (600 c.p.)	59
Blue Hills Reservation, Hillside Street (80 c.p.)	14
Charles River Dam (1500 c.p.)	16
Charles River Reservation, Embankment Road (87–100 c.p., 17–600 c.p.)	104
Charles River Reservation, North Beacon Street Bridge (4–1500 c.p., 9–1000 c.p.)	13
Charles River Reservation, Soldiers Field Road (51–1000 c.p., 47–1500 c.p.)	98
Dorchester Bay Bridge (1500 c.p.)	8
East Milton St. (600 c.p.)	13
Fresh Pond Parkway (100 c.p.)	15
Furnace Brook Parkway (600 c.p.)	66 [1]
Harvard Bridge (24–600 c.p., 6–100 c.p.)	30
Lynn Fells Parkway (600 c.p.)	28 [2]
Lynn Shore Reservation (6–1500 c.p., 24–1000 c.p.)	30
Lynnway (1–1000 c.p., 10–600 c.p.)	11
Memorial Drive (16–600 c.p., 173–250 c.p.)	189
Middlesex Fells Parkway (7–1500 c.p., 207–600 c.p.)	214 [3]
Middlesex Fells Reservation (2–80 c.p., 36–250 c.p., 77–600 c.p.)	115 [4]
Mystic Valley Parkway (1–250 c.p., 88–600 c.p.)	89 [5]
Nahant Beach Parkway (1500 c.p.)	12 [6]
Nantasket Beach Reservation (40–100 c.p., 12–600 c.p.)	52 [7]
Neponset Bridge (600 c.p.)	16
Old Colony Parkway (49–1500 c.p., 2–1000 c.p.)	51
Pilgrim Boulevard (600 c.p.)	6
Quincy Shore Reservation (600 c.p.)	43 [8]
Revere Beach Parkway (600 c.p.)	181 [9]
Revere Beach Reservation (5–60 c.p., 1–40 c.p., 108–1500 c.p.)	114 [10]
Saugus River Bridge (100 c.p.)	7
Weeks Bridge (100 c.p.)	30
West Roxbury Parkway (600 c.p.)	27 [11]
Winthrop Parkway (14–250 c.p., 7–600 c.p.)	21
Winthrop Shore Reservation (600 c.p.)	7
Woburn Parkway (600 c.p.)	4
Total	1,708

[1] Thirty-nine all night, all year. Twenty-three all night, except November 1 to March 31, until 1 A.M. Four all night, April 1 to October 31.
[2] Seventeen all year until 1 A.M.
[3] Fifty-five 600 c.p. March 15 to November 31.
[4] Two 80 c.p. and twenty-nine 600 c.p. all year until 1 A.M.
[5] Ten 600 c.p. all night, except November 1 to March 31 until 1 A.M. Thirty-two 600 c.p. all year until 1 A.M.
[6] Five June 1 to December 1.
[7] Twelve 600 c.p. and eleven 100 c.p. in summer only.
[8] Thirty-six all night, except November 1 to March 31 to 1 A.M. Seven all night, April 1 to October 31.
[9] Seventy-seven all night, April 1 to October 31.
[10] Thirty-three 1500 c.p., all night, May 1 to October 31. Thirty-three 1500 c.p. to midnight June 1 to September 30. One 60 c.p. all night, May 1 to September 30.
[11] All night, except November 1 to March 31 until 1 A.M.

TABLE 6

Miles of Seashore

	Miles
Lynn Shore	1.50
Nahant Beach	3.92
Revere Beach	2.74
Winthrop Shore	1.71
Nantasket Beach	1.02
Quincy Shore	2.19
Total	13.08

Lengths of Sea Walls

	Miles
Lynn Shore	1.30
Revere Beach at Northern Circle	.08
Revere Beach at Eliot Circle	.15
Revere Beach, shore protection, bath house shelter to Revere Street shelter	.29
Winthrop Shore, bridge to Great Head	1.04
Revere Beach, shore protection, south of Northern Circle	.28
Winthrop Shore, bridge to Grover's Cliff	.23
Quincy Shore Reservation, shore protection south of Webster Street	1.08
Quincy Shore Reservation, southerly end	.15
Nantasket Beach Reservation	.54
Winthrop Parkway, Revere and Winthrop, Broad Sound Avenue, to Sewall Avenue	.52
Total	5.66

Miles of River Bank

	Miles
Charles River	33.56
Mystic River	8.16
Neponset River	15.86
Alewife Brook	4.50
Total	62.08

TABLE 7

Bridges

Reinforced concrete bridges	19
Steel bridges	12
Wooden bridges	7[1]
Drawbridges	6
Footbridges	12
Total	56

Culverts

Reinforced concrete and other masonry culverts	44

TABLE 8

Dams

Beaver Brook Reservation, small wooden dams	2
Blue Hills Reservation, small wooden dam	1
Charles River Reservation, wooden dam at Watertown, 220 feet in length	1
Charles River Reservation, Charles River Basin, tidal dam, 1,200 feet in length	1

1. One half of Wellington Bridge rebuilt with concrete girders.

Charles River Reservation, small stone dam in branch below Washington Street, Newton Lower Falls	1
Charles River Reservation, reinforced concrete dam at Washington Street, Newton Lower Falls, 175 feet in length	1
Furnace Brook Parkway, reinforced concrete dam, upstream from Black's Creek Bridge	1
Hemlock Gorge Reservation, small stone masonry dam with stop planks, in gorge	1
Hemlock Gorge Reservation, small reinforced concrete dam on east branch of river, Newton Upper Falls	1
Hemlock Gorge Reservation, reinforced concrete dam in Charles River at Boylston Street, Newton Upper Falls, 90 feet in length	1
Mystic River Reservation, reinforced concrete tidal dam at Cradock Bridge, 100 feet in length; weirs 400 feet in length	1
Total	12

Lock Gates, Sluice Gates and Tide Gates

Charles River Reservation, Charles River Basin Tidal Dam, 6 lock gates, 13 sluice gates, 43 tide gates.
Mystic River Reservation, Cradock Bridge Tidal Dam, 2 lock gates, 4 sluice gates, 8 tide gates.
Quincy Shore Reservation, 8 tide gates.
Revere Beach Parkway, 1 tide gate.

TABLE 9

Police Signal System

	Miles
Blue Hills Division	31½
Middlesex Fells Division	22
Nantasket Beach Division	2½
Charles River Reservation	10
Fresh Pond Parkway	½
Total	66½

Revere Beach Division police signal system, serving 11 miles of parkways and reservations, and Middlesex Fells Division, serving 1½ miles of parkway, on wires leased from the New England Telephone and Telegraph Company.

REPORT OF DIRECTOR AND CHIEF ENGINEER OF WATER DIVISION

DAVIS B. KENISTON, *Commissioner, Metropolitan District Commission.*

SIR:—I respectfully submit the following report of the construction and maintenance operations of the Water Division for the calendar year 1930.

ORGANIZATION

At the beginning of the year there were 52 permanent employees in the main and branch offices, and 293 permanent and temporary employees engaged in maintaining and operating the reservoirs, aqueducts, pipe lines, hydroelectric and pumping stations and in doing miscellaneous construction work. The force at the main and branch offices was increased by three permanent employees. The chemist in charge of the Sudbury Section laboratory, who had been transferred to the Metropolitan District Water Supply Commission, temporarily, was reinstated early in January and work at that laboratory was then resumed. The maintenance and operating force was increased by 11 permanent employees, made necessary by a change in the operating hours of the force in the pumping stations from 48 to 44

each week, in accordance with legislation establishing a weekly half holiday for this force, and by 3 permanent employees on account of providing for 24-hour operation at Spot Pond and Hyde Park stations. Including the temporary force employed during the summer the maximum number of employees of all classes at any time during the year was 400. There are now 56 permanent employees in the main and branch offices and 310 permanent and temporary employees engaged in the maintenance and operation of the works.

On account of the unusual number of men out of employment early in the year special temporary forces were employed in the woodlands of the Water Division and in areas which had been planted with young pine trees, on the work of improving conditions which would otherwise have been done later with the regular forces when there was an opportunity. An expenditure of $10,648.25 was made from the regular appropriation for this work, which provided employment for 81 men.

METROPOLITAN WATER DISTRICT AND WORKS

The Water District now includes 20 municipalities with an area of about 174 square miles and population as of July 1, 1930, of 1,503,230. The Water Works lands include an area of about 19,000 acres, of which about 2,000 acres have been planted with pine trees.

The works include 9 storage reservoirs with 200 square miles of tributary watershed, a total storage capacity of 80 billion gallons and water surface of 8,600 acres; 60 miles of aqueducts; 2 hydroelectric power stations of a capacity of 7,000 horse-power; 16 miles of high-tension power transmission line; 5 distribution pumping stations with a combined equipment of 6,100 horse-power and pumping capacity of 282 million gallons a day; 12 distribution reservoirs with a capacity of 2.5 billion gallons, and 158.73 miles of distribution mains. The consumption of water from the Metropolitan Water Works during the year by the 18 municipalities regularly supplied was 49,792,038,000 gallons, equivalent to an average daily consumption of 136,416,500 gallons or 98.2 gallons per capita for a population of 1,389,610 in the district supplied.

CONSTRUCTION

Purchase of Cast Iron Water Pipes, Fittings, Valves and Pipe Line Appurtenances

Contract No. 72 for 10 street chambers for Venturi meter registers was made January 2 with the Walsh Holyoke Steam Boiler Works, Inc. Work has been completed and the total value is $3,056.68.

Contract No. 74 for 2,640 tons of cast iron water pipes and specials was made June 3 with the Warren Foundry & Pipe Company. Work has been completed and the total value is $126,056.07.

Contract No. 78 for six 20-inch gate valves was made October 11 with the Chapman Valve Manufacturing Company. Work has been completed and the total value is $4,571.35.

Eighteen 6-inch automatic air valves for steel pipe lines were made at the Water Works machine shop at Chestnut Hill pumping station.

Meters and Connections

Early in the spring a 20-inch by 10-inch Venturi meter, with a 6-inch by 3-inch Hersey detector meter on the by-pass, was installed on the connection with the town of Brookline water main on Fisher Avenue. The cost of this installation was $6,722.44.

Weston Aqueduct Supply Mains

The construction of the new Weston Aqueduct supply main which was in progress last year has been continued. The main will extend from the existing pipes under the Charles River at Commonwealth Avenue in Newton,

through Brighton to the existing 48-inch pipe line in Magazine Street at Memorial Drive in Cambridge.

Under Contract No. 73, made with the C. and R. Construction Company on April 18, 5,400 feet of electrically welded steel pipe 60 inches in diameter and ½-inch in thickness was laid in Western Avenue and Market Street in Brighton. The value of the work done under this contract is $113,003.29.

Northern High Service Pipe Lines

The new Northern High Service pipe line was extended from Broadway, Revere, to Winthrop and East Boston during the year.

Under Contract No, 75, made with John Williams on July 19, 5,483 feet of cast iron water pipe 24 inches in diameter was laid from Broadway to Ocean Avenue in Revere. This work has been completed and the total value is $23,196.71.

Under Contract No. 76, made with Cenedella & Company on August 30, 12,208 feet of cast iron water pipe 20 inches in diameter was laid from the end of the 24-inch pipe line in Ocean Avenue to the Revere-Winthrop boundary line, and 1,212 feet of cast iron water pipe 16 inches in diameter was laid from the 20-inch pipe line in Bennington Street to the East Boston-Revere boundary line. The work under this contract is not entirely completed; the pipes are laid but the trenches have not been permanently resurfaced. The total value of the contract work when completed will be about $41,000.00.

No settlements have been made for the easements taken for these pipe lines.

Chlorinating Plants at Weston and Sudbury Aqueducts

In the latter part of the year chlorinating plants were installed on the Weston and Sudbury aqueducts.

Under Contract No. 77, the Wallace & Tiernan Company, Inc., furnished the chlorination control equipment for the Weston Aqueduct plant for $6,050 and for the Sudbury Aqueduct plant for $2,900.

The equipment for the Weston Aqueduct was installed in the screen chamber at the outlet of the Weston Reservoir and includes three manual control solution feed chlorinators, Type MSV, with external injectors. Each machine has a maximum capacity of 300 pounds of chlorine in 24 hours. The equipment also includes two LeCourtenay single stage pumps, directly connected to two 5-horse-power electric motors and an Apco priming tank. The entire cost of this plant installed, including electric line and other appurtenances, was $7,203.99.

The equipment for the Sudbury Aqueduct was installed in a small wooden building constructed below the gate-house at the dam of Framingham Reservoir No. 1, and includes two chlorinators of the same type and capacity as on the Weston Aqueduct, also two LeCourtenay pumps, two 3-horse-power motors, and an Apco priming tank. One of the chlorinators at this plant was formerly located in the gate-house at Dam No. 1, where it was not possible to operate it in extremely cold weather. Its capacity has now been increased from 100 pounds to 300 pounds of chlorine in 24 hours. The entire cost of this plant, installed, including building and all appurtenances, was $3,712.11.

As chlorine control equipment had been installed formerly in the intermediate gate-chamber at the outlet of the Cochituate Aqueduct at Chestnut Hill Reservoir, it is now possible to chlorinate the entire water supply when necessary.

MAINTENANCE

Precipitation and Yield of Watersheds

The total precipitation during 1930 on the Wachusett watershed, 34.97 inches, is 9.88 inches below the average for 34 years and the lowest recorded on the watershed during that period; on the Sudbury watershed 34.40 inches

is 9.90 inches below the average for 56 years and only 1.62 inches above the minimum for that period of 32.78 inches, in 1883; and on the Cochituate watershed 33.69 inches is 11.09 inches below the average for 68 years, during which period the minimum precipitation was 31.20 inches, in 1883, while in 1908 there was only 33.03 inches.

The average daily yield per square mile for all three of the watersheds was the lowest on record; 566,000 gallons from the Wachusett, which is 53 per cent of the average for 34 years, 339,000 gallons from the Sudbury, 41 per cent of the average for 56 years, and 428,000 gallons from the Cochituate, 46 per cent of the average for 68 years.

Water was drawn from the South Sudbury works directly for consumption from Ashland Reservoir through the 24-inch pipe line continuously from March 21 to December 12. The total quantity of water used from this reservoir was 1,945 million gallons.

Water was diverted from the Hopkinton and Whitehall reservoirs of the South Sudbury Works into the Sudbury Reservoir through the 20-inch and 30-inch pipe lines from January 14 to November 3. The total quantity of water diverted from these reservoirs was 3,262 million gallons.

No water was pumped directly from the Sudbury River at Cordaville during the year.

No water was discharged into the Wachusett Reservoir during the year from the area formerly tributary to the reservoir which was diverted by the city of Worcester in 1911 for its water supply.

Storage Reservoirs

The capacities of the storage reservoirs of the Metropolitan Water Works, the elevation of the water surfaces and the quantity of water stored in each reservoir at the beginning and at the end of the year are shown by the following table:

Storage Reservoirs	Elevation[1] of High Water to top of flash boards	Total Capacity (Gallons)	Jan. 1, 1930		Jan. 1, 1931	
			Elevation[1] of Water Surface	Available Storage (Gallons)	Elevation[1] of Water Surface	Available Storage (Gallons)
Cochituate Watershed:—						
Lake Cochituate[2]	144.36	2,097,100,000	143.70	1,843,600,000	142.90	1,656,000,000
Sudbury Watershed:—						
Sudbury Reservoir	260.00	7,253,500,000	258.52	5,382,100,000	250.82	2,403,400,000
Framingham Reservoir No. 1	169.32	289,900,000	167.75	128,300,000	167.66	124,400,000
Framingham Reservoir No. 2	177.12	529,900,000	176.03	433,100,000	175.92	428,400,000
Framingham Reservoir No. 3	186.74	1,180,000,000	184.85	867,100,000	183.98	797,900,000
Ashland Reservoir	225.21	1,416,400,000	224.39	955,300,000	203.36	34,400,000
Hopkinton Reservoir	305.00	1,520,900,000	304.09	1,013,000,000	286.71	118,300,000
Whitehall Reservoir	337.91	1,256,900,000	337.18	807,900,000	333.71	172,000,000
Wachusett Watershed:—						
Wachusett Reservoir	396.50	67,000,000,000	375.90	31,036,100,000	354.81	13,260,000,000
Totals	–	82,544,600,000	–	42,466,500,000	–	18,994,800,000

[1] Elevation in feet above Boston City Base.
[2] Excluding Dudley Pond which was abandoned April 3, 1916.

The table shows the total storage capacity to the bottom of the reservoirs, but it is not convenient or desirable to use for consumption about 12 billion gallons of the water stored in the bottom portion of these reservoirs.

Wachusett Reservoir

At the beginning of the year there was 31,036 million gallons of water conveniently available for use stored in Wachusett Reservoir, with the surface of the water at elevation 375.90 and 19.1 feet below the designed

high-water line. By February 20 the water had been drawn down 2.5 feet, then rising slowly it reached elevation 376.55 on April 21, which was the maximum elevation for the year, with 31,688 million gallons of water stored and available for use. During the dry weather that followed the water was drawn down steadily until November 2, when the water was at elevation 356.30. From November 2 to December 8 no water was drawn from the reservoir for the Metropolitan Water Supply and during this period the water rose to elevation 358. During the remainder of the year the water was drawn down and was at elevation 354.81 at the end of the year, when there was only 13,260 million gallons of water in this, the largest Metropolitan Water Works reservoir, conveniently available for use. This is 7.95 feet lower than the reservoir has previously been drawn since it first filled in 1908.

In compliance with the provisions of General Laws, chapter 92, section 14, that at least 12 million gallons of water shall be discharged each week from the reservoir into the Nashua River to maintain a flow in the river below the dam, 626 million gallons of water was so discharged during the year.

Under the provisions of Acts of 1923, chapter 348, the town of Clinton pumped 128.8 million gallons of water from the reservoir to reinforce and improve the quality of the supply from its own source. Water was pumped for about 6 hours each day, excepting Sundays, January 1 to December 2, inclusive.

As the city of Worcester had not constructed the works required for diverting water from the Quinapoxet Pond drainage area in the Wachusett watershed, as provided for by Acts of 1926, chapter 375, the city was permitted to pump about 5 million gallons of water a day from the Wachusett Reservoir at South Bay, and July 22 to December 31, inclusive, pumped 873.2 million gallons to reinforce its supply.

Brush and weeds growing along the margins of the reservoir, North and South dikes, adjacent highways, and the brooks and rivers that flow directly into the reservoir, were cut and burned. This work extended over a distance of 70 miles and cost about $105 a mile.

Wire fences were erected to enclose Water Works lands for a distance of 2.07 miles along property lines and highways in West Boylston, Sterling and Holden at a cost of about $1,500 a mile, exclusive of the posts, which were obtained from the Water Works lands. Eighty-seven wire and pipe frame gates in existing fences were cleaned, repaired and painted.

Perennials and driftwood were removed along the flow line of the reservoir for a distance of about 29 miles, and 165 acres of exposed reservoir bottom, made up of small scattered areas where there was a heavy growth of rank weeds, was cleared by mowing and burning the weeds. The cost of the work was $2,162.

A small water course in Boylston was straightened, graded and paved for a distance of 160 feet at a cost of $402.

Standing grass on about 245 acres of land on the margins of the reservoir and main feeders was sold at auction in July for $347.

About 25 per cent of the joints in the granite masonry on the water face of the dam between elevation 374 and elevation 398 were repointed and the remaining joints were painted with Portland cement grout.

The improvement of the lower entrance to the dam, which was suspended in December, 1929, was resumed in April and has been completed with the exception of the planting of trees and shrubs.

At the Clinton storage yard conditions have been improved by converting an old shed for use as a storage place for paints and oils, by building an addition to the carpenter shop 40 feet long by 21 feet wide, by installing a buzz planer and an edging saw acquired with the Kicker Car Mill in Holden, and by replacing the old board fence which was erected about 30 years ago to enclose the yard, with 743 feet of chain link fence 7 feet in height. All of the department buildings near the reservoir have been kept in good repair; the four dwelling houses are rented to satisfactory tenants, three of whom are employees.

Sudbury Reservoir

At the beginning of the year the water in Sudbury Reservoir was at elevation 258.52 and 0.48 of a foot below the crest of the overflow at the dam. The water in the reservoir was kept a little below the crest of the overflow until March 31 when the flashboards were placed and the water was then held a little above the crest until the first of November, when it became necessary to draw the water down so that the Public Works Department could extend several culverts in connection with the reconstruction of Worcester Street in Southborough. This work was completed December 8. The water in Sudbury Reservoir was then down to elevation 248.88, the supply from Wachusett Reservoir having been shut off since November 2. From December 8 to the end of the year water was again drawn from Wachusett Reservoir and during this period the water in Sudbury Reservoir rose 1.83 feet and was at elevation 250.71. During December all of the water supplied to the Weston Aqueduct from Sudbury Reservoir was by-passed around the water wheels as the head available was not sufficient for satisfactory operation of the electric generators.

The grounds, fences, walls and shores of the reservoir were kept in good condition and the buildings and other structures were repaired and painted as required.

The gasoline pump and 1,500 feet of fire hose purchased in July have given good service in extinguishing forest fires.

The Southborough swimming pool which has not been in use for two or three years, was rebuilt by extending the outlet pipe into the pool about 250 feet to a brick chamber which was built at the lowest point in the pool, and water is now drawn out from the bottom of the pool instead of the top as formerly. A gravel dam was also built to cut off the narrow channel from the main pool so as to prevent the accumulation of leaves and debris. Silt and dirty sand was replaced with clean coarse gravel over the entire bottom of the pool and for a width of about 15 feet on the shore.

In 1929, the Fayville Fire and Water District installed a water supply system including a pumping station, several miles of distribution pipes and a standpipe, under the provisions of Acts of 1923, chapter 474, and began to use water from the reservoir on December 20, 1929.

Early in 1930, the town of Southborough began the work of installing a water supply system for the town under the provisions of Acts of 1930, chapter 133, and laid additional water pipes and constructed two additional standpipes, one in the main village and another in Southville, and later took over the works of the Fayville Fire and Water District. The amount of water pumped from the reservoir during 1930 was about 6,270,000 gallons and averaged about 15,000 gallons a day from January 1 to November 8, and 30,000 gallons a day during the remainder of the year.

Framingham Reservoir No. 3

Flashboards were kept at elevation 186.50 on the overflow of the dam at Framingham Reservoir No. 3 throughout the year, and the water in the reservoir varied from elevation 183.92 to 186.06 during the year. A large portion of the water supply for the Sudbury Aqueduct was drawn from this reservoir, which was replenished with water from the Sudbury Reservoir as required.

The buildings and grounds at the reservoir have been kept in good condition and the lanes along the property lines have been cleared of sprouts and brush.

Ashland, Hopkinton and Whitehall Reservoirs

Water was drawn from the Ashland Reservoir from March 21 to December 12 through the 24-inch pipe line for supplying the town of Framingham and the Metropolitan Water District. The elevation of the water in the reservoir went down from 224.74 feet in March to 202.22 feet in November, and was 203.31 feet at the end of the year. The quantity of water withdrawn was 1,945 million gallons.

Water was diverted from Whitehall Reservoir into Hopkinton Reservoir through the 20-inch pipe line throughout the year. The elevation of the water in this reservoir varied from 337.56 feet in May to 332.66 feet in October.

Water was diverted from Hopkinton Reservoir into the Sudbury Reservoir from January 14 to November 3. The total diversion was 3,261.74 million gallons, and the elevation of the water in Hopkinton Reservoir varied from 304.19 feet in January to 283.74 feet in November, and was 286.66 feet at the end of the year.

At all of these reservoirs the shores and the buildings, grounds and woodlands have been kept in good order and sprouts have been cut in the lanes along the property lines.

Framingham Reservoirs Nos. 1 and 2 and Farm Pond

With the exception of 18.5 million gallons of water which was drawn from Reservoir No. 1 December 12, 13 and 14, and 1.5 million gallons which was discharged daily to maintain a flow in the Sudbury River below Reservoir No. 1, as required by Acts of 1872, chapter 177, the yield from these reservoirs overflowed from Reservoir No. 1 into the Sudbury River, and as flashboards were not placed on the overflows the water in these reservoirs was about the same level as the crest of the overflows throughout the year.

On account of the low stage of the water in the other reservoirs, 1,475 pounds of copper sulphate was applied to the water in Reservoir No. 2 on November 24 and 950 pounds was applied to Reservoir No. 1 on November 25 as an algaecide to prepare the water in these reservoirs for use in case it should be required.

The woodwork inside the department house at Reservoir No. 1 was painted, the structures at the dams and the Water Works lands have been kept in good condition, and the lanes along the property lines have been mowed.

From March 8 to April 24, inclusive, 7.4 million gallons of water overflowed from Farm Pond into the Sudbury River, as this pond is not now used as a source of water supply. Under rights reserved by legislation, the Boston & Albany Railroad took approximately 50.4 million gallons of water and the New York, New Haven & Hartford Railroad took approximately 13 million gallons of water directly from the pond for use in locomotives during the year.

Lake Cochituate

The elevation of the water in Lake Cochituate was 143.70 feet at the beginning of the year and varied from 144.35 feet in March to 141.74 feet in October and was 142.96 feet at the end of the year.

From January 1 to May 8 water was wasted from the lake. The quantity wasted was 2,055.2 million gallons.

Beginning on May 12 water was drawn from the lake through the Cochituate Aqueduct for consumption but the flow was stopped on May 15 when it was discovered that oil from a filling station in Wellesley was leaking into the aqueduct through seams in a ledge and cracks in the masonry. The use of water from the lake was resumed August 25, after the condition had been remedied, and was continued until October 5, when the use of water was again stopped on account of an objectionable growth of microscopic organisms in the water. To remedy this condition, 4,530 pounds of copper sulphate was applied to the water between October 3 and October 11, and 1,800 pounds of copper sulphate was again applied to the water in the southerly portion of the lake between October 29 and November 1. The use of water from the lake was again resumed December 12 and was continued to the end of the year. The total quantity of water used from the lake for consumption during the year was 742.2 million gallons.

The driveways and grounds about the dam, foreman's headquarters and gate-house, and the shores of the lake, have been kept in good order; dead and broken trees have been cut on the Water Works lands, and brush, weeds

and sprouts have been mowed in the lanes along the property lines and along Bannister's Brook and the surface water drain that diverts the surface drainage of Cochituate Village outside the watershed.

Aqueducts

The *Wachusett Aqueduct* was used on 271 days during the year, for a total time of 116 days, 9 hours and 41 minutes. The total quantity of water drawn from the Wachusett Reservoir through the aqueduct is 38,387,200,000 gallons, an average draft of 105,170,000 gallons for every day in the year, and all of the water was used to generate electric energy at the Wachusett Power Station before it was discharged into the aqueduct.

The Westborough State Hospital pumped 65,413,000 gallons of water from the aqueduct at the terminal chamber in Marlborough during the year, an average daily pumpage of 179,000 gallons. A deposit that had formed on the throat of the Venturi meter was removed.

The rebuilding of the driveway at the top of the slope on the northerly side of the open channel, for a distance of about a mile below the terminal chamber, which has been in progress for several years, was completed this year.

Brush, grass and weeds were mowed and disposed of for a distance of 10 miles along the aqueduct at a cost of about $300 a mile.

The *Weston Aqueduct* was used every day in the year, the total time in service amounting to 313 days, 22 hours and 13 minutes. During this time 35,905,800,000 gallons of water was conveyed from the Sudbury Reservoir to the Weston Reservoir, of which 2,780,800,000 gallons was by-passed around the water wheels on account of the low water in Sudbury Reservoir, and the remainder was used to generate electric energy before it was discharged into the aqueduct. The average daily flow in this aqueduct for the entire year was 98,372,000 gallons.

The iron and wood work of the gaging and siphon chambers has been painted, culverts have been kept open, fences have been repaired and the grass, weeds and brush have been mowed and disposed of along the entire length of the aqueduct.

The *Sudbury Aqueduct* was in continuous use and was supplied with 10,751,900,000 gallons of water from Framingham Reservoir No. 3 with 1,945,000,000 gallons from Ashland Reservoir and with 18,500,000 gallons from Framingham Reservoir No. 1, a total of 12,715,400,000 gallons, of which the town of Framingham pumped 536,200,000 gallons for its supply and the remaining 12,179,200,000 gallons, equivalent to an average of 33,367,671 gallons a day, was delivered to the Chestnut Hill Reservoir for consumption in the Metropolitan Water District.

On September 11 the town of Framingham was granted permission to erect a new pumping station on Water Works land on the east side of Winter Street and the south side of the Sudbury River and to pump water from the lower end of the northerly 48-inch supply main from Framingham Reservoir No. 3. The new station was nearly completed at the end of the year.

A new gravel walk was constructed from Ellis Street in Newton Upper Falls to the platform under the main arch of Echo Bridge, which is a place of interest to many visitors. The plank walk from Chestnut Street to the east end of the bridge was rebuilt. The aqueduct lands and structures were cared for in the usual manner.

The *Cochituate Aqueduct* was in service May 12 to 16, August 25 to October 5, and December 12 to the end of the year, a total of 66 days. While the aqueduct was in use 742,200,000 gallons of water was conveyed from Lake Cochituate to Chestnut Hill Reservoir, equivalent to an average flow of 2,033,425 gallons a day for the entire year.

On May 16 oil was noticed on the surface of the water in the aqueduct at the pipe chamber on the westerly side of the Charles River crossing. This chamber had served as a separator and prevented the oil from flowing into the distribution system. The water flowing into the aqueduct at Lake Co-

chituate was therefore shut off and the water in the aqueduct was drained out into the Charles River. Upon investigation oil was discovered flowing into the aqueduct through cracks in the masonry near a filling station and garage in Wellesley, which had been constructed on a seamy ledge a short distance from the aqueduct. To remedy this condition a leaking oil tank was removed by the operator of the filling station and garage and the masonry aqueduct was repointed and made water-tight by the Water Division. In connection with this work a new manhole was constructed for entrance to the aqueduct a short distance east of the garage. The cost of repairing the aqueduct was $3,483. After the repairs were completed the aqueduct was washed out and sterilized with chlorine, and was put into service again August 25. It was necessary to interrupt the flow in the aqueduct again from October 6 to December 12 while an objectionable growth of microscopic organisms in Lake Cochituate was destroyed by treating the water with copper sulphate.

The regular maintenance of the aqueduct lands and structures was attended to in the usual manner.

Protection of the Water Supply

To prevent pollution of the water supply a Sanitary Engineer and two aids and six watchmen have been employed throughout the year to inspect ice cutting and other operations, and the condition of the premises on the watersheds, and to enforce the sanitary rules and regulations.

The Water Division forces have operated the filter-beds on Beaman Street in West Boylston throughout the year to purify the sewage from the Worcester County Training School, and the Gates Terrace filter-beds at Sterling Junction from May 1 to October 29 to purify the sewage from summer cottages in that vicinity. Sewage from the Eagleville Mill and the Mt. Pleasant House in Holden, and from the Fay School and Deerfoot Farm sausage factory and dairy in Southborough was purified by privately owned and operated filter-beds.

Surface water from thickly settled drainage areas of 525 acres in the village of Sterling, from 1,280 acres along the brook near Maple Street in Marlborough, and from 700 acres along Pegan Brook and an intercepting ditch in Natick was purified by filters operated by Water Division forces before it flowed into the water supply, with the exception of 7.3 million gallons which overflowed from the intercepting ditch in Natick, and this water that overflowed was sterilized with chlorine before it entered Lake Cochituate.

At the Pegan Brook filters the pumping station was operated on 187 days and 179,478,000 gallons of water was pumped to the filters, an average of 491,721 gallons per day for the entire year. The cost of operating the station and caring for grounds and filter-beds was $5,741.83 for labor, $369.70 for fuel, and $235.69 for supplies and repairs, a total of $6,347.22, which is $35.36 per million gallons filtered. The fuel cost per million foot gallons was $0.17. The cost of protecting the water supply by filtration was $1,089 for the Wachusett, $5,142 for the Sudbury and $6,347.22 for the Cochituate watershed.

On December 3 sewage was discovered flowing over the Weston Aqueduct land from a college a short distance south of the aqueduct, near its entrance to the Weston Reservoir. Upon investigation it was found that a trench had been excavated through a ridge which separated the sewage disposal works of the college from the aqueduct land. Temporary dams were immediately constructed to prevent further flow of sewage on to the aqueduct land, which was thoroughly sterilized with chlorine. The college authorities have employed a Sanitary Engineer to prepare plans for the installation of adequate sewage disposal works that will not endanger the water supply.

Improved brook channels, ditches, culverts and watering places were maintained in the usual manner. The cost of maintaining 35 miles of drainage ditches on all of the watersheds was $5,800.

For the protection of the water supply, property was acquired in the

Wachusett watershed, in Holden, from Augusta H. Niebuhr 30.92 acres, and from Charles A. Holmes in Sterling and West Boylston 0.4 of an acre with the buildings thereon; in the Sudbury watershed in Marlborough, from Charles A. Moore 0.308 acre of land with the building thereon, in Hopkinton from S. Stearns Crooks 3,781 acres of land.

All of the buildings that were on the lands acquired in Holden last year at the Quinapoxet, Lovellville and Kicker Car Company mills have been disposed of with the exception of the stone box mill of the Kicker Car Company, which is retained as a storehouse. The mill ponds acquired with these properties have been drained and the grounds have been cleared and graded.

The building formerly used as a garage, which was located on the land in Marlborough acquired from Charles A. Moore, has been removed and the land has been cleared and graded.

Clinton Sewage Disposal Works

The works constructed under the provisions of Acts of 1898, chapter 557, for disposing of the sewage of the town of Clinton, were operated on 362 days and were idle on May 12, 13 and 14 while repairs were being made to the check valve in the force main, during which time the sewage overflowed into the South Branch of the Nashua River, the flow of which was, however, considerably increased at that time by water drawn from the Lancaster Mills Pond, located a short distance upstream above the pumping station.

The cost of operating the pumping station was $3,257.29. which is $8.59 per million gallons and is $0.17 per million foot gallons. The cost of operating the filters and intercepting sewer was $10,745.37, which is $28.33 per million gallons disposed of by sedimentation, filtration and irrigation.

The following tables contain a summary of the sanitary inspections on all the watersheds and of the sanitary census for the Wachusett and Sudbury watersheds by districts for 1930, also a summary of the sanitary census of 1925 for these watersheds for comparison.

Summary of Sanitary Inspections on the Wachusett Watershed in 1930

District	Number of Premises inspected	Classification of Cases Inspected[1]													Condition at End of Year	
		Cesspools dug before 1930	Cesspools dug during 1930	Direct privy drainage	Indirect privy drainage	Direct sink drainage	Indirect Sink Drainage		Barn Drainage		Manufacturing Wastes	Premises vacant	No drainage	Drainage carried to Filter-beds	Satisfactory	Unsatisfactory
							Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory						
French Brook	75	59	–	–	–	–	7	–	18	–	–	9	–	–	75	–
Muddy Brook	45	38	–	–	–	–	5	–	12	–	–	2	–	–	45	–
Gates Brook	323	299	1	–	–	–	10	–	28	–	–	9	4	–	323	–
Malden Brook	32	25	–	–	–	–	4	–	18	–	–	2	1	–	32	–
Chaffin Brook	341	274	6	–	–	–	44	5	50	–	–	16	1	–	336	5
Asnebumskit Brook	251	212	2	–	2	2	11	2	15	–	1	18	5	1	246	5
Musquapoag	111	71	–	–	–	–	25	1	38	–	–	13	2	–	110	1
South Wachusett Brook	86	51	–	–	–	–	23	–	29	–	–	9	3	–	86	–
Trout Brook	41	20	1	–	–	–	13	–	17	–	–	6	1	–	41	–
East Wachusett Brook	211	120	–	–	–	–	67	1	59	–	–	19	4	–	210	1
Stillwater River	138	76	4	–	–	–	39	–	49	–	–	10	8	1	138	–
Waushacum	318	235	1	–	–	–	56	1	45	–	–	22	3	85	317	1
French Hill	40	39	–	–	–	–	1	–	15	–	–	–	–	–	40	–
Totals	2,012	1,519	15	–	2	2	305	10	393	–	1	135	32	87	1,999	13

[1] On some premises there are two or more cases.

Summary of Sanitary Inspections on the Sudbury and Cochituate Watersheds in 1930

District	Number of Premises inspected	Classification of Cases Inspected[1]												Condition at End of Year	
		Sewer Connections	Cesspools dug before 1930	Cesspools dug during 1930	Direct Privy Drainage	Indirect Privy Drainage	Direct Sink Drainage	Indirect Sink Drainage		Barn Drainage		Manufacturing Wastes	Drainage carried to Filter-beds	Satisfactory	Unsatisfactory
								Satisfactory	Unsatisfactory	Satisfactory	Unsatisfactory				
Sudbury Watershed:															
Farm Pond	371	364	3	–	–	–	–	–	–	–	–	–	–	371	–
Framingham Reservoir No. 3	107	–	80	1	–	–	–	9	–	21	–	–	–	107	–
Stony Brook	334	–	287	3	–	–	–	15	–	64	1	–	3	333	1
Angle Brook	2,307	1,948	246	1	–	–	–	14	–	53	–	–	2,073	2,307	–
Framingham Reservoirs Nos. 1 and 2 and Cold Spring Brook	396	–	335	8	–	1	–	31	1	63	–	–	–	395	1
Eastern Sudbury	271	–	247	2	–	–	–	7	1	15	–	1	1	269	2
Indian Brook	409	–	328	3	–	–	–	45	1	36	1	1	–	406	3
Western Sudbury	197	–	140	–	–	–	–	37	–	40	–	–	–	197	–
Whitehall Reservoir	205	–	80	–	–	–	–	80	1	26	–	–	–	204	1
Cedar Swamp	828	566	222	1	–	–	–	21	–	81	–	–	–	828	–
Totals	5,425	2,878	1,968	19	–	1	–	259	4	399	2	2	2,077	5,417	8
Cochituate Watershed:															
Snake Brook	386	–	324	6	–	–	–	31	–	24	–	–	–	386	–
Pegan Brook	1,315	957	291	2	–	–	–	23	–	12	–	1	1,191	1,315	–
Course Brook	236	28	182	4	–	–	–	15	–	18	–	–	–	236	–
Beaver Dam Brook	2,465	1,861	461	11	–	–	–	31	1	61	–	1	1	2,463	2
Totals	4,402	2,846	1,258	23	–	–	–	100	1	115	–	2	1,192	4,400	2

[1] On some premises there are two or more cases.

Wachusett Watershed—Sanitary Census by Districts for 1930, and for Entire Watershed for 1925 and 1930

District	Premises								Area (Square Miles) including Water Surface	Population			Domestic Animals			
	Number on which there are dwellings occupied throughout the year	Summer dwellings	Number on which there are no dwellings	Vacant	Total number	Having Public Water Supply	Having Private Water Supply	Having no Water Supply		Permanent	Summer	Permanent per Square Mile	Horses	Cattle	Sheep	Swine
French Brook	57	4	5	9	75	4	62	–	7.30	246	13	33.7	33	208	–	114
Muddy Brook	40	1	2	2	45	–	43	–	3.41	175	2	51.3	21	51	–	1
Gates Brook	303	–	11	9	323	17	293	4	3.93	1,394	6	354.7	46	68	4	35
Malden Brook	27	2	1	2	32	–	29	1	3.05	125	32	41.0	20	70	–	3
Chaffin Brook	315	2	8	16	341	228	96	1	10.56	1,446	5	136.9	53	179	7	47
Asnebumskit Brook	213	2	18	18	251	220	8	5	3.61	1,185	74	328.3	21	89	2	27
Musquapoag	86	8	4	13	111	11	85	2	11.88	431	30	36.3	61	333	–	47
South Wachusett Brook	57	16	4	9	86	–	74	3	11.33	220	93	19.4	44	303	75	14
Trout Brook	34	–	1	6	41	–	34	1	7.65	157	–	20.5	22	158	–	1
East Wachusett Brook	134	49	9	19	211	–	188	4	20.88	533	256	25.5	81	439	–	42
Stillwater River	116	1	11	10	138	–	120	8	11.87	606	9	51.1	78	411	–	120
Waushacum	158	127	11	22	318	–	293	3	7.70	617	578	80.1	67	433	32	41
French Hill	39	1	–	–	40	–	40	–	5.67	179	2	31.6	13	41	–	10
Totals for 1930	1,579	213	85	135	2,012	480	1,365	32	108.84	7,314	1,100	67.2	560	2,783	120	502
Totals for 1925	1,508	222	114	117	1,961	434	1,354	56	108.84	7,173	1,486	65.9	704	2,681	269	442

Sudbury Watershed—Sanitary Census by Districts for 1930 and for Entire Watershed for 1925 and 1930

District	Premises								Population		Domestic Animals			
	Number on which there are dwellings occupied throughout the year	Summer Dwellings	Number on which there are stores or other buildings but no dwellings	Vacant	Total number	Having Public Water Supply	Having Private Water Supply	Having no Water Supply	Permanent	Summer	Horses	Cattle	Sheep	Swine
Framingham Reservoir No. 3	84	6	1	16	107	11	79	1	313	32	57	261	–	34
Stony Brook	292	2	22	18	334	38	270	8	1,481	5	114	846	–	7
Angle Brook	2,089	2	138	78	2,307	2,113	103	13	11,711	4	71	183	3	10
Cold Spring Brook above Ashland Reservoir	121	3	2	17	143	61	64	1	485	85	58	153	2	872
Indian Brook above Hopkinton Reservoir	346	–	22	29	397	336	30	2	1,413	–	25	76	–	10
Whitehall Brook above Whitehall Reservoir	20	57	–	41	118	–	77	–	86	261	8	47	–	–
Totals for 1930	2,952	70	185	199	3,406	2,559	623	25	15,489	387	333	1,566	5	933
Totals for 1925	3,393	111	205	203	3,912	3,436	248	25	20,708	380	280	735	24	31

TABLE 2 — *Metropolitan Park System — Areas of Reservations and Parkways — December 1, 1930*

		Reservations (Acres).																Parkways (Acres).																		Grand Total Reservations and Parkways (Acres).	
		Beaver Brook.	Blue Hills.	Bunker Hill.	Charles River.	Hart's Hill.	Hemlock Gorge.	King's Beach and Lynn Shore.	Middlesex Fells.	Mystic River.	Nantasket Beach.	Neponset River.	Quincy Shore.	Revere Beach.	Stony Brook.	Winthrop Shore.	Total Acres.	Alewife Brook.	Blue Hills.	Brook Road and Reedsdale Road	Dedham.	Fresh Pond.	Furnace Brook.	Hammond Pond.	Lynn Fells.	Lynnway.	Middlesex Fells.	Mystic Valley.	Nahant Beach.	Neponset River.	Old Colony.	Quannapowitt.	Revere Beach.	West Roxbury.	Winthrop.	Woburn.	Total Acres.		
	Cities.																																					
1	Boston,	-	-	6.05	172.24	-	-	-	-	-	-	145.90	-	-	463.72	-	787.91	-	.27	-	21.98	-	-	-	-	-	-	-	-	28.80†	50.75	-	-	75.65	-	-	177.45	965.36	1
2	Cambridge,	-	-	-	223.74	-	-	-	-	-	-	-	-	-	-	-	223.74	86.21	-	-	-	12.40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	98.61	322.35	2
3	Chelsea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21.16	-	-	-	21.16	21.16	3
4	Everett,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	31.14	-	-	-	31.14	31.14	4
5	Lynn,	-	-	-	-	-	-	19.59	-	-	-	-	-	-	-	-	19.59	-	-	-	-	-	-	-	-	-	-	-	.32	-	-	-	-	-	-	.32	19.91	5
6	Malden,	-	-	-	-	-	-	-	59.53	-	-	-	-	-	-	-	59 53	-	-	-	-	-	-	-	-	-	23.58	-	-	-	-	-	-	-	-	23.58	83.11	6
7	Medford,	-	-	-	-	-	-	-	950.71	42.32	-	-	-	-	-	-	993.03	-	-	-	-	-	-	-	-	-	44.56	265.34	-	-	-	8.10	-	-	-	318.00	1,311.03	7
8	Melrose,	-	-	-	-	-	-	-	177.54	-	-	-	-	-	-	-	177.54	-	-	-	-	-	-	-	14.40	-	-	-	-	-	-	-	-	-	-	14.40	191.94	8
9	Newton,	-	-	-	183.55	-	4.24	-	-	-	-	-	-	-	-	-	187.79	-	-	-	-	-	-	116.23	-	-	-	-	-	-	-	-	-	-	-	116.23	304.02	9
10	Quincy,	-	2,562.57	-	-	-	-	-	-	-	-	-	34.71	-	-	-	2,597.28	-	-	-	-	-	105.08*	-	-	-	-	-	-	-	2.72	-	-	-	-	107.80	2,705.08	10
11	Revere,	-	-	-	-	-	-	-	-	-	-	-	-	64.29	-	-	64.29	-	-	-	-	-	-	-	-	5.15	-	-	-	-	-	-	67.21	-	8.61	-	80.97	145.26	11
12	Somerville,	-	-	-	-	-	-	-	-	4.03	-	-	-	-	-	-	4.03	9.97	-	-	-	-	-	-	-	-	11.83	4.95	-	-	-	-	-	-	-	26.75	30.78	12
13	Waltham,	42.77	-	-	38.65	-	-	-	-	-	-	-	-	-	-	-	81.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81.42	13
14	Woburn,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22.64	22.64	22.64	14
	Towns.																																					
15	Arlington,	-	-	-	-	-	-	-	-	7.83	-	-	-	-	-	-	7.83	28.10	-	-	-	-	-	-	-	-	-	17.40	-	-	-	-	-	-	-	45.50	53.33	15
16	Belmont,	15.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.56	20.43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20.43	35.99	16
17	Braintree,	-	67.84	-	-	-	-	-	-	-	-	-	-	-	-	-	67.84	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	67.84	17
18	Brookline	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	71.11	-	-	-	-	-	-	-	-	13.66	-	-	84.77	84.77	18
19	Canton,	-	471.34	-	-	-	-	-	-	-	-	264.26	-	-	-	-	735.60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	735.60	19
20	Dedham,	-	-	-	6.51	-	-	-	-	-	-	234.54	-	-	-	-	241.05	-	-	-	15.16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.16	256.21	20
21	Dover,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21
22	Hingham,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	22
23	Hull,	-	-	-	-	-	-	-	-	-	25.59	-	-	-	-	-	25.59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25.59	23
24	Milton,	-	1,547.91	-	-	-	-	-	-	-	-	269.09	-	-	-	-	1,817.00	-	83.31	15.60	-	-	-	-	-	-	-	-	-	51.16	-	-	-	-	-	-	150.07	1,967.07	24
25	Nahant,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81.66	-	-	-	-	-	-	81.66	81.66	25
26	Needham,	-	-	-	-	-	14.24	-	-	-	-	-	-	-	-	-	14.24	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14.24	26
	[Randolph],	-	257.00	-	-	-	-	-	-	-	-	-	-	-	-	-	257.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	257.00	
27	Saugus,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.89	-	-	-	-	-	-	-	-	-	-	15.89	15.89	27
28	Stoneham,	-	-	-	-	-	-	-	702.80	-	-	-	-	-	-	-	702.80	-	-	-	-	-	-	-	.15	-	-	-	-	-	-	-	-	-	-	.15	702.95	28
29	Swampscott,	-	-	-	-	-	-	3.10	-	-	-	-	-	-	-	-	3.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3.10	29
30	Wakefield,	-	-	-	-	22.97	-	-	-	-	-	-	-	-	-	-	22.97	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15.54	-	-	-	15.54	38.51	30
31	Watertown,	-	-	-	78.79	-	-	-	-	-	-	-	-	-	-	-	78.79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	78.79	31
32	Wellesley,	-	-	-	66.07	-	4.58	-	-	-	-	-	-	-	-	-	70.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	70.65	32
33	Weston,	-	-	-	139.82	-	-	-	-	-	-	-	-	-	-	-	139.82	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	139.82	33
34	Westwood,	-	-	-	-	-	-	-	-	-	-	6.57	-	-	-	-	6.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.57	34
35	Weymouth,	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	35
36	Winchester,	-	-	-	-	-	-	-	261.93	-	-	-	-	-	-	-	261.93	-	-	-	-	-	-	-	-	-	-	50.20	-	-	-	-	-	-	.60	50.80	312.73	36
37	Winthrop	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.83	16.83	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	.13	-	.13	16.96	37
		58.33	4,906.66	6.05	909.37	22.97	23.06	22.69	2,152.51	54.18	25.59	920.36	34.71	64.29	463.72	16.83	9,681.32	144.71	83.58	15.60	37.14	12.40	105.08	187.34	30.44	5.15	79.97	337.89	81.98	79.96	53.47	15.54	127.61	89.31	8.74	23.24	1,519.15	11,200.47	

* Includes Pilgrim Boulevard from Furnace Brook Parkway to Sea Street.

† Includes East Milton St. from Wolcott Square to Paul's Bridge.

TABLE 3. — *Metropolitan Park System — Mileage of Roadways — December 1, 1930*

		Alewife Brook Parkway	Blue Hills Parkway		Blue Hills Res.	Brook Road and Reedsdale Road		Charles River Res.		Dedham Parkway	East Milton Street		Fresh Pond Parkway	Furnace Brook Parkway	Lynn Fells Parkway	Lynn Shore Res.	Lynnway	Memorial Drive		Middlesex Fells Parkway		Middlesex Fells Res.		Mystic Valley Parkway	Nahant Beach Parkway	Nantasket Beach Res.	Neponset River Parkway	Old Colony Boulevard	Pilgrim Boulevard	Quannapowitt Parkway	Quincy Shore Res.	Revere Beach Parkway		Revere Beach Res.
			Main	Second		Main	Second	Main	Second		Main	Second						Main	Second	Main	Second	Main	Second										Main	Second	
	Cities																																		
1	Boston	–	.02	–	–	–	–	4.30	.21	.49	.48	.19	–	–	–	–	–	–	–	–	–	–	–	–	–	.52	2.85	–	–	–	–	–	–	
2	Cambridge	1.31	–	–	–	–	–	–	–	–	–	–	.52	–	–	–	–	4.03	.43	–	–	–	–	–	–	–	–	–	–	–	–	–	–	
3	Chelsea	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.81	.33	–
4	Everett	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.66	.66	–
5	Lynn	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.04	.12	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
6	Malden	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.87	1.12	.57	–	–	–	–	–	–	–	–	–	–	–	–
7	Medford	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.80	2.61	3.94	.40	3.19	–	–	–	–	–	–	–	.47	–	–
8	Melrose	–	–	–	–	–	–	–	–	–	–	–	–	–	1.90	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
9	Newton	–	–	–	–	–	–	2.57	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
10	Quincy	–	–	–	4.55	–	–	–	–	–	–	–	–	3.93	–	–	–	–	–	–	–	–	–	–	–	–	–	.31	.42	–	2.44	–	–	–
11	Revere	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.57	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2.19	.51	2.70
12	Somerville	.93	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.48	.54	–	–	.38	–	–	–	–	–	–	–	–	–	–
13	Waltham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
14	Woburn	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
	Towns																																	
15	Arlington	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.46	–	–	–	–	–	–	–	–	–	–
16	Belmont	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
17	Braintree	–	–	–	.33	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
18	Brookline	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
19	Canton	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
20	Dedham	–	–	–	–	–	–	–	–	.49	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
21	Dover	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
22	Hingham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
23	Hull	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.71	–	–	–	–	–	–	–	–
24	Milton	–	2.82	1.46	5.26	1.69	1.58	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	.53	–	–	–	–	–	–	–
25	Nahant	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1.94	–	–	–	–	–	–	–	–	–
26	Needham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
27	Saugus	–	–	–	–	–	–	–	–	–	–	–	–	–	1.71	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
28	Stoneham	–	–	–	–	–	–	–	–	–	–	–	–	–	.02	–	–	–	–	–	–	5.97	–	–	–	–	–	–	–	–	–	–	–	–

Forestry

In the Wachusett Section 43,600 white pine and 55,100 red pine transplants were set out in new plantings and 8,700 white pine, 12,900 red pine and 1,000 spruce transplants were set out to fill in previous plantings.

In the Sudbury section 10,050 red pine and 2,000 spruce transplants were set out in new plantings and 7,270 white pine, 1,960 red pine and 131 spruce transplants were set out to fill in previous plantings, and about 10,800 pines were used for new plantings in the Distribution Section. Clearings were made covering an area of about 80 acres and the usual fire protection service was maintained during the dry seasons.

In the Wachusett Section about 46 miles of marginal fire guards and forest roads 15 to 45 feet in width were mowed and the brush and weeds were burned at a cost of about $30 a mile, and the undergrowth was cleared from a strip of Water Works land about 100 feet in width and 5½ miles in length fronting on the main highways that surround the reservoir, and the lower branches of the trees on this strip were cut off for a height of about 6 feet. This work covered an area of about 75 acres and cost about $45 an acre.

In the Sudbury Section about half the fire guards were cleared this year.

The total expenditure for forestry was $30,093.34, of which $3,146.17 was expended for protecting the trees and shrubs from insects.

Hydroelectric Service

The hydroelectric power stations at the Wachusett Dam in Clinton and at the Sudbury Dam in Southborough are operated by the water drawn for water supply from the reservoirs above these dams. On account of the low stage of the water in the Wachusett Reservoir and of maintaining the water in Sudbury Reservoir about 10 feet below the usual elevation, while several highway culverts were being extended, only 10,493,287 kilowatt hours of electric energy was developed at these power stations in 1930, or approximately only two-thirds of the output in 1929.

The value of the energy delivered in 1930 at contract prices is $64,844.66, and deducting $58,712.92, the expenditures charged to the operation of both stations and the Water Division transmission line, there was a profit of $6,131.74.

Wachusett Station

The operation of the new switching and protective equipment installed at the Wachusett Station has been entirely satisfactory. The westerly portion of the 66,000-volt transmission line was reconditioned for a distance of 7.67 miles. In connection with this work 42 new wooden poles were set, the butts of 162 old wooden poles were chipped and treated with preservative and 6 steel towers were painted.

The power station was operated on 270 working days during the year, was idle during one week in April for repairs, and for five weeks in November and December while culverts were being extended at Sudbury Reservoir, and on Sundays and holidays. The statistics are as follows:

Total energy developed (kilowatt hours)	6,087,800	
Energy used at power station (kilowatt hours)	27,959	
Available energy (kilowatt hours)		6,059,841
Water used (gallons)		38,375,300,000
Average head (feet)		71.8
Energy developed per million foot gallons (kilowatt hours)		2.209
Efficiency of station (per cent)		70.3

Credits:		
Energy sold New England Power Company and Edison Electric Illuminating Company:		
5,907,221 kilowatt hours at $0.00625	$36,920.13	
Deduction of 2 per cent as provided in contract:		
118,144 kilowatt hours at $0.00625	738.40	
Energy furnished Clinton Sewerage Pumping Station:		
152,620 kilowatt hours at $0.00625	953.88	
		$37,135.61
Charges:		
Superintendence	$1,542.66	
Labor, operating station	9,917.99	
Repairs and supplies:		
Power Station	2,004.93	
Transmission line	2,967.63	
	$16,433.21	
Taxes	3,000.00	
Administration, general supervision, interest and sinking fund	13,698.64	
		$33,131.85
Profit		$4,003.76
Cost of available energy per thousand kilowatt hours		$5.467

Sudbury Station

The Sudbury power station was operated on 357 days during the year; 191 days for three shifts covering the entire 24 hours, and 143 days for 16 hours with two shifts, and 23 days for 8 hours on one shift.

Units Nos. 1 and 2 were not operated from November 30 to January 1 because of low water in the reservoir.

The old water supply pump at the station was replaced with a new pump during the year. The work of equipping the buildings, and the chamber below the dam with electric lights was completed this year. The statistics are as follows:

Total energy developed (kilowatt hours)	4,490,560	
Energy used at power station (kilowatt hours)	57,114	
Available energy (kilowatt hours)		4,433,446
Framingham Reservoir No. 3 service:		
Water used (gallons)		10,715,400,000
Average head (feet)		65.18
Weston Aqueduct service:		
Water used (gallons)		33,125,000,000
Average head (feet)		38.49
Energy developed per million foot gallons (kilowatt hours)		2.275
Efficiency of station (per cent)		72.5

Credits:		
Energy sold Edison Electric Illuminating Company: 4,433,446 kilowatt hours at $0.00625		$27,709.05
Charges:		
Superintendence	$1,580.45	
Labor, operating station	14,435.37	
Repairs and supplies	474.54	
	$16,490.36	
Taxes	1,698.80	
Administration, general supervision, interest and sinking fund	7,391.91	
		$25,581.07
Profit		$2,127.98
Cost of available energy per thousand kilowatt hours		$5.770

Distribution Pumping Stations

At the five distribution pumping stations 28,970 million gallons of water was pumped during 1930; this is 544 million gallons less than was pumped at these stations during the previous year. The water pumped at the Chestnut Hill Station included 5,783 million gallons for the low service and 17,542 million gallons for the high service, which includes 114.033 million gallons for a portion of the supply of the town of Brookline, 155.397 million gallons for a portion of the supply of the city of Newton, and 527 million gallons which was repumped at the Hyde Park Station for the southern extra high service. At the Spot Pond Station 4,506 million gallons was pumped for the northern high service, including 41.339 million gallons supplied to the town of Wakefield, and at the Arlington Station 612 million gallons was pumped for the northern extra high service. By arrangement with the city of Newton 527.52 million gallons of water was repumped from the southern high service from November 26, 1929, to November 26, 1930, by the city at its Ward Street booster station for use on the high land in Belmont and Watertown where satisfactory service cannot be furnished from the Chestnut Hill Station, and for this pumping the Commonwealth has paid the city $6,481.39.

The average engine duties at the Water Division stations based on plunger displacement and total coal used for all purposes, including heating and lighting the stations, are as follows:

Chestnut Hill Station No. 1, 124,382,000 foot pounds per 100 pounds of bituminous coal averaging 14,664 British thermal units per pound.

Chestnut Hill Station No. 2, 140,337,000 foot pounds per 100 pounds of bituminous coal averaging 14,687 British thermal units per pound.

Spot Pond Station, 108,267,000 foot pounds per 100 pounds of mixed bituminous and anthracite coal averaging 14,665 British thermal units per pound.

Arlington Station, 96,561,000 foot pounds per 100 pounds of mixed bituminous and anthracite coal averaging 14,714 British thermal units per pound.

Hyde Park Station, 73,358,000 foot pounds per 100 pounds of mixed bituminous and anthracite coal averaging 14,718 British thermal units per pound. The fires are banked for a portion of each day at this station.

At the beginning of the year there was 2,120 net tons of bituminous coal and 343 net tons of anthracite screenings on hand at the pumping stations and the amount on hand at the end of the year was 2,382 net tons of bituminous coal and 20 net tons of anthracite screenings.

The repointing of the stone and brick masonry of the Chestnut Hill Pumping Station buildings, which was in progress at the close of 1929, was continued and was completed October 11, 1930. In connection with this work 8 windows in the building occupied by the shops were lengthened

30 inches at the bottom so as to admit more light; 6 of the windows are in the machine shop on the east side and 2 are in the blacksmith shop on the north side. All of the masonry is now in good condition.

The woodwork and metalwork at all of the stations has been repaired and painted by the regular pumping station forces as required.

A new 42-inch by 15-foot gap lathe was installed in the machine shop which is now well equipped to handle most of the large work required in connection with the operation of the stations. All of the general repairs at all stations are now satisfactorily made by the regular pumping station force of machinists, blacksmith and carpenter. This force also makes automatic air valves for the steel pipe lines, installs chlorinating equipment and makes special repairs as required for other sections of the work. The work of installing larger plungers to increase the pumping capacity of engine No. 10 at the Arlington Station and of putting this old engine in condition for the present requirements was completed late in December.

The boilers and economizers at all stations have been cleaned and inspected regularly and are now in good condition, but as some of the boilers have been in service over 30 years it has become necessary to make replacements in order to operate at the desired steam pressure. Under a special maintenance appropriation old boiler No. 10 was removed from the Spot Pond Station and a new vertical fire-tube boiler known as No. 24, has been installed. The new boiler is 98 inches in diameter and 24 feet in height and was built from our drawings by the D. M. Dillon Steam Boiler Works. The non-heat-conducting covering was applied to the new boiler by Keasbey & Mattison Company, which also resurfaced boiler No. 23 and covered some steam piping under its contract.

The grates, water columns, gages, and water and steam piping were installed by the regular pumping service force and the boiler was put into service November 20. The cost of the replacement was, for new boiler $6,845, for removing old boiler and erecting new boiler $720, for heat insulating coverings $490, and for grates, piping and miscellaneous work $1,945, making the total cost $10,000.

Beginning October 26 the regular working time for employees engaged in operating the stations was reduced from 48 hours a week to 44 hours a week. As a result of this change the operating force has been increased by 11 additional men and the operating cost is increased by $19,000 a year. Supervision and clerical work has also been considerably increased as all stations are operated continuously in 3 eight-hour watches, arranged so that the employees shift watches every month.

Distribution Reservoirs

The locations, elevations and capacities of the distribution reservoirs of the Metropolitan Water Works are shown by the following table:

Distribution Reservoirs and Locations	Elevation of High Water[1]	Capacity in Gallons
Low Service:		
Spot Pond, Stoneham and Medford	163.00	1,791,700,000
Chestnut Hill Reservoir, Brighton district of Boston	134.00	300,000,000
Weston Reservoir, Weston	200.00	200,000,000
Mystic Reservoir, Medford	157.00	26,200,000
Northern High Service:		
Fells Reservoir, Stoneham	271.00	41,400,000
Bear Hill Reservoir, Stoneham	300.00	2,450,000
Northern Extra High Service:		
Arlington Reservoir, steel tank, Arlington	442.50	2,000,000
Southern High Service:		
Fisher Hill Reservoir, Brookline	251.00	15,500,000
Waban Hill Reservoir, Newton	264.50	13,500,000
Forbes Hill Reservoir, Quincy	192.00	5,100,000
Forbes Hill Standpipe, Quincy	251.00	330,000
Southern Extra High Service:		
Bellevue Reservoir, steel tank, West Roxbury district of Boston	375.00	2,500,000
Total	–	2,400,680,000

[1] Elevation in feet above Boston City Base.

Powder Horn Hill Reservoir of the city of Chelsea is used when necessary for the northern high service. It has a capacity of 1,000,000 gallons with high-water line at elevation 196.6 and was in service from January 1 to March 25 and from November 29 to December 31.

The Mystic and Forbes Hill reservoirs have been kept full of water for an emergency, but were not used during the year.

The Lawrence Basin of the Chestnut Hill Reservoir was out of service from July 26 to 30 and from December 13 to 31.

The Arlington Reservoir Standpipe was out of service from May 2 to June 8 for repainting. This work was done by the Shrewsbury Tank Company for $885. The inside was cleaned and painted 3 coats and the outside was touched up and painted 1 coat.

All other distribution reservoirs were in regular service throughout the year.

Under a contract with the W. A. Snow Iron Works, Inc., the Waban Hill Reservoir in Newton was inclosed by the construction of 1,164 feet of iron picket fence on Ward Street and Manet Road and 653 feet of chain link fence along the rear of the lot, at a cost of $3,687.19.

Under the same contract 986 feet of iron picket fence was erected along the front of Fisher Hill Reservoir lot on Fisher Avenue in Brookline, at a cost of $2,278.24.

The towers at the Arlington and Bellevue reservoirs were opened to visitors on Sundays and holidays during the summer. The grounds and structures at all of the reservoirs have been cared for by the regular forces and are in good condition.

The Parks Division was paid $4,199.59 for police service at Chestnut Hill Reservoir and $2,071.03 for service at Spot Pond, Fells and Bear Hill reservoirs.

Distribution Pipe Lines

The usual maintenance work has been done in connection with the operation of the pipe lines. Special repairs were necessary on the duplicate lines of 36-inch low service submerged pipe lines crossing the Charles River at Magazine Street in Cambridge; 10 special split sleeves were installed at this place by a diver to stop the leaks in these lines. During the latter part of the year the work of removing the rubbish that had been dumped over the 20-inch northern high service pipe line where it is laid on a pile foundation in the salt marsh north of Mystic Avenue in Medford was in progress so that the pipe which was settling under the weight of the filling could be raised to the original grade.

On July 14 a break occurred in the 12-inch northern high service pipe in Boston Avenue at Professors' Row in Medford; on August 5 a break occurred in the 20-inch southern extra high service pipe near the Hyde Park Pumping Station in Boston; on August 25 a break occurred in the easterly 24-inch southern high service pipe line in Adams Street near Washington Street in Milton and caused considerable damage to the street, lawns and basements; and on December 19 a break occurred in the 48-inch low service pipe line in Clinton Road near Dean Road in Brookline. The cost of repairing these four breaks was $5,611.94.

During the year 44 leaks on main pipes were repaired at a cost of $5,664.47.

An additional metered connection was installed between the 16-inch northern extra high service pipe line and the new 16-inch Lexington pipe line in Massachusetts Avenue near the Arlington boundary line. This connection was put into service August 16.

In May and June the connection between the northern high service pipe line and the Winthrop water mains on Revere Street at the Winthrop-Revere boundary line was reconstructed and the 10-inch pressure regulating valve was replaced with a 16-inch regulating valve.

A 12-inch by 6-inch Hersey detector meter was installed in June on Metropolitan Avenue at Summit Street at the Boston-Milton boundary line to replace the detector meter and regulating valve located on Summit Street

near Milton Avenue, but the new meter had not been put in service at the end of the year.

There are 82 Venturi meters varying in size from 6 to 60 inches in diameter in the distribution pipe lines; 69 of these are on connections supplying various towns in the Metropolitan Water District, 5 are on the Weston Aqueduct supply mains, 1 at each of the pumping stations at Arlington, Hyde Park and Spot Pond, 1 at each of the emergency connections in Cambridge, Newton and Wakefield, 1 on the service connection to the Walter E. Fernald State School and Metropolitan State Hospital in Waltham, and 1 on the connection between the high-service and low-service mains at Chestnut Hill Reservoir. There are also 11 disc and 14 detector meters in use for measuring small quantities of water supplied at various places.

Of the 10 pressure regulating valves for reducing pressure of water supplied to Revere, Swampscott and Winthrop and portions of Chelsea, East Boston and Hyde Park, 7 are in regular use and the others are kept in good order for emergency use.

Recording pressure gages have been maintained at 30 places on the distribution system and tables in the Appendix show the hydraulic grade at 16 of these stations as determined by the charts.

Pipes, specials and other materials and supplies required for maintaining and operating the pipe lines are kept on hand at the Glenwood pipe yard in Medford and Chestnut Hill pipe yard in Brighton.

Auto trucks equipped with gate-operating attachments have been maintained with men on duty ready to operate them in case of emergency at any time during the day or night.

Consumption of Water

During the year 49,792,038,000 gallons of water was furnished from the Metropolitan Water Works to the 18 cities and towns regularly supplied. This is equivalent to an average daily consumption of 136,416,500 gallons, and for the estimated population of 1,389,610 is at the rate of 98.2 gallons per capita.

The town of Brookline, with an estimated population of 47,730, used from its local source 1,600,610,000 gallons of water, of which 381,086,000 gallons was supplied from elevation 375 and 1,219,524,000 gallons was supplied from elevation 250. In addition to this consumption the town was supplied with some water from the Metropolitan Water Works every month in the year except February and March. The total quantity supplied from the Metropolitan Water Works is estimated as 114,033,000 gallons, making the total average daily consumption of the town 4,697,700 gallons, equivalent to 98 gallons per capita.

The city of Newton, with an estimated population of 65,890, was supplied from its local source, with the exception of 155,397,000 gallons, which was furnished from the Metropolitan supply. Including this water, the average daily consumption was 4,998,100 gallons, equivalent to 76 gallons per capita. The amount of water furnished the city of Newton from the Metropolitan supply is 141,897,000 gallons in excess of the quantity to which the city is entitled to take free of charge under the agreement made in 1900 when the Waban Hill Reservoir was purchased from the city, and for this water the city will pay $11,983.20.

Through the Quincy distribution system the United States Government Reservation on Peddock's Island was supplied with 2,099,000 gallons of water and the town of Braintree was supplied with 159,000 gallons. The town of Winchester was supplied with 636,000 gallons of water through the Arlington system and the town of Saugus was supplied with 955,000 gallons through the Melrose system.

Through the Stoneham system the town of Wakefield was supplied with 41,339,000 gallons of water between August 12 and December 18.

The population, consumption of water and per cent of services metered in the Metropolitan Water District as supplied in 1930 and for the period from 1890 to 1930, inclusive, are shown graphically by the accompanying diagram.

The average daily consumption of water in each of the municipalities in the Metropolitan Water District during 1929 and 1930 is as follows:

	Estimated Population, 1930	Average Daily Consumption				Decrease in Gallons
		1929		1930		
		Gallons	Gallons per Capita	Gallons	Gallons per Capita	
Arlington	36,650	1,863,900	54	1,982,100	54	118,200[1]
Belmont	22,070	1,263,200	61	1,308,500	59	45,300[1]
Boston	781,270	93,832,100	120	92,286,000	118	1,546,100
Chelsea	45,740	3,610,800	78	3,569,400	78	41,400
Everett	48,740	5,066,600	107	4,966,500	102	100,100
Lexington	9,550	656,500	71	630,100	66	26,400
Malden	58,350	3,692,600	65	3,645,600	62	47,000
Medford	60,320	3,325,700	57	3,356,900	56	31,200[1]
Melrose	23,320	1,502,200	66	1,628,900	70	126,700[1]
Milton	16,610	829,900	52	868,700	52	38,800[1]
Nahant	1,660	208,000	126	197,000	119	11,000
Quincy	72,580	5,596,500	80	5,498,700	76	97,800
Revere	35,800	2,234,400	63	2,225,200	62	9,200
Somerville	104,150	8,581,600	83	9,376,200	90	794,600[1]
Stoneham	10,110	667,100	67	690,400	68	23,300[1]
Swampscott	10,420	738,500	73	811,300	78	72,800[1]
Watertown	35,380	2,216,700	66	2,168,100	61	48,600
Winthrop	16,890	1,158,000	69	1,206,900	71	48,900[1]
District supplied	1,389,610	137,044,300	100	136,416,500	98	627,800
Brookline	47,730	4,716,600	101	4,697,700	98	18,900
Newton	65,890	4,746,800	75	4,998,100	76	251,300[1]
Total District	1,503,230	146,507,700	99	146,112,300	97	395,400

[1] Increase.

The consumption by districts in 1930 as compared with 1929 is as follows:

	Gallons per Day 1930	Decrease from 1929	
		Gallons per Day	Percentage
Low service district, embracing the low-service districts of Arlington, Belmont, Boston, Chelsea, Everett, Malden, Medford, Somerville and Watertown	72,352,000	395,400	0.54
Southern high-service district, embracing Quincy, the high-service district of Boston, except East Boston, and portions of Milton and Watertown	46,941,900	445,700	0.94
Southern intermediate high-service district, embracing portions of Belmont and Watertown	1,431,600	18,000[1]	1.27[1]
Northern high-service district, embracing Melrose, Nahant, Revere, Stoneham, Swampscott, and Winthrop and the high-service districts of Chelsea, East Boston, Everett, Malden, Medford and Somerville	12,507,600	140,700[1]	1.14[1]
Southern extra high-service district, embracing the higher portions of Hyde Park, Milton and West Roxbury	1,467,400	37,100	2.47
Northern extra high-service district, embracing Lexington and the higher portions of Arlington and Belmont	1,716,000	91,700[1]	5.65[1]
District Supplied	136,416,500	627,800	0.46
Brookline and Newton	9,695,800	232,400[1]	2.46[1]
Total District	146,112,300	395,400	0.27

[1] Increase.

Water from Metropolitan Water Works Sources used Outside of the Metropolitan Water District

Places where Water is Used	Total Quantity (Gallons)	Average Quantity (Gallons per Day)	Amount Charged
Town of Rutland	92,200,000 [1]	252,700	–
Town of Holden	19,900,000 [2]	54,500	–
Town of Clinton	128,800,000	353,000	–
Westborough State Hospital	65,413,000	179,000	$1,962.39
Town of Westborough	69,350,000	190,000	–
City of Worcester	873,200,000	2,392,000	–
Town of Ashland	58,400,000	160,000	–
Town of Framingham	536,140,000	1,468,877	20,138.91
Town of Natick	272,460,000	746,466	–
Town of Wayland	1,980,000	5,425	–
United States Army Reservation at Peddock's Island in Hull	2,099,000	5,750	183.69 [3]
Portion of Town of Braintree	159,000 [4]	436	–
Town of Wakefield	41,339,000	113,258	4,960.68
Portion of Town of Winchester	636,000 [5]	1,742	–
Portion of Town of Saugus	955,000 [6]	2,616	–
Metropolitan Parks, Middlesex Fells	6,939,000	19,011	–
Walter E. Fernald State School and Metropolitan State Hospital	83,665,000	229,219	6,067.34

Notes. — Water is used throughout the year in all places except the town of Clinton, which took water on 283 days, the city of Worcester, which took water on 163 days, and the town of Wayland which took water on 181 days.

The average daily use is in all cases figured on basis of 365 days.

Water was furnished the town of Brookline through the connection in Fisher Avenue for various periods in every month except February and March.

Through the emergency connection on Ward Street near Hammond Street, water was furnished to the city of Newton every month during the year, the total quantity supplied being 155,397,000 gallons, or 141,897,000 gallons in excess of the quantity that the city is entitled to take free of charge under the agreement made in 1900 when the Waban Hill Reservoir was purchased from the city, and for this water the city will pay $11,983.20.

[1] All but 404,000 gallons diverted from watershed.

[2] Not diverted from watershed.

[3] Water supplied by the Commission through City of Quincy pipes, and by agreement revenue is divided in equal shares between the City and Commonwealth.

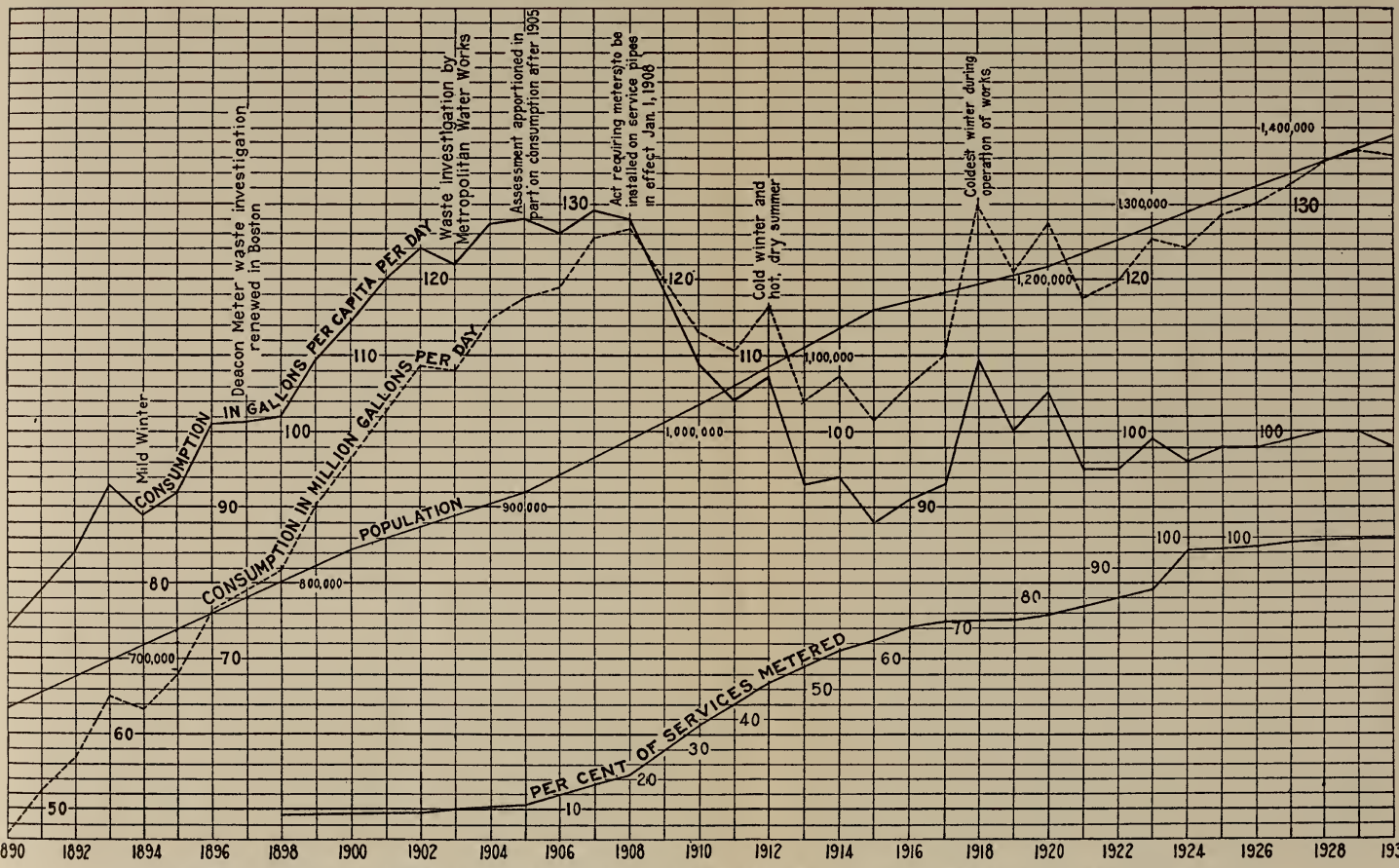
[4] The City of Quincy supplies the water at regular rates and pays the Commonwealth by an addition to its regular apportionment.

[5] The Town of Arlington supplies the water at regular rates and pays the Commonwealth by an addition to its regular apportionment.

[6] The City of Melrose supplies the water at regular rates and pays the Commonwealth by an addition

POPULATION, CONSUMPTION OF WATER AND PER CENT OF SERVICES METERED IN THE METROPOLITAN WATER DISTRICT AS SUPPLIED IN 1930

FROM 1890 TO 1930



Note Estimated population and consumption per capita given on diagrams published in previous annual reports are revised from time to time as regular census figures become available

Information regarding the installation of meters on service pipes by the municipalities supplied with water from the Metropolitan Water Works for the year 1930 and other statistics are given in tables in the Appendix.

Respectfully submitted,

William E. Foss,
Director and Chief Engineer.

Boston, January 2, 1931.

REPORT OF DIRECTOR AND CHIEF ENGINEER OF SEWERAGE DIVISION

Davis B. Keniston, *Commissioner, Metropolitan District Commission.*

Dear Sir:—The following report of the operations of the Metropolitan Sewerage Works for the year ending December 31, 1930, is respectfully submitted:

Organization

The Director and Chief Engineer has charge of the design and construction of all new works, and of the maintenance and operation of all the works controlled by the Metropolitan District Commission for removing sewage from the thirty-two municipalities which comprise the Metropolitan Sewerage Districts.

The following assistants have been employed during the year: Henry T. Stiff, Associate Civil Engineer, in charge of office and drafting room and of the construction work.

Ralph W. Loud, Senior Civil Engineer, in charge of survey work and field work in connection with the New Neponset Valley Sewer construction.

Charles F. Fitz, Assistant Civil Engineer, in charge of maintenance studies and of maintenance construction work on the North Metropolitan System.

Benjamin Rubin, Assistant Civil Engineer, in charge of survey work and field work in connection with the Braintree-Weymouth Branch Sewer construction.

Arthur F. F. Haskell, Superintendent, North Metropolitan Sewerage District.

Frank B. Williams, Superintendent, South Metropolitan Sewerage District.

In addition to the above, the maximum number of engineering and other assistants employed during the year was 36, which includes 5 assistant engineers, 8 instrumentmen, 1 supervising sewer construction inspector, 5 inspectors, 1 draftsman, 13 rodmen and engineering assistants, 1 chauffeur and 2 stenographers.

METROPOLITAN SEWERAGE DISTRICTS

Areas and Populations

During the year no additions to the area of the Metropolitan Sewerage Districts have been made. The addition of the town of Weymouth to the South Metropolitan Sewerage District was authorized by Chapter 398 of the Acts of 1930 subject to the approval of the town. The town has not yet approved the Act.

The populations of the districts, as given in the following table, are based on the census of 1930.

Table showing Ultimate Contributing Areas and Present Estimated Populations within the Metropolitan Sewerage Districts, as of December 31, 1930.

	City or Town	Area (Square Miles)		Estimated Population	
North Metropolitan District	Arlington	5.20		37,580	
	Belmont	4.66		22,610	
	Boston (portions of)	3.45		93,150	
	Cambridge	6.11		113,800	
	Chelsea	2.24		46,070	
	Everett	3.34		49,270	
	Lexington [1]	5.11		6,300	
	Malden	5.07		59,010	
	Medford	8.35		61,390	
	Melrose	3.73		23,600	
	Reading	9.82		9,940	
	Revere	5.86		36,220	
	Somerville	3.96		104,740	
	Stoneham	5.50		10,180	
	Wakefield	7.65		16,460	
	Winchester	5.95		12,880	
	Winthrop	1.61		16,980	
	Woburn	12.71		19,540	
			100.32		739,720
South Metropolitan District	Boston (portions of)	24.96		350,790	
	Braintree	13.44		16,090	
	Brookline	6.81		48,360	
	Canton	17.84		5,820	
	Dedham [1]	9.40		14,550	
	Milton	12.59		16,950	
	Needham	12.50		11,100	
	Newton	16.88		66,800	
	Norwood	10.16		15,180	
	Quincy	12.56		73,590	
	Stoughton	16.23		8,260	
	Walpole	20.54		7,390	
	Waltham [2]	13.63		40,290	
	Watertown	4.04		36,040	
	Wellesley	9.89		11,750	
			201.47		722,960
	Totals		301.79		1,462,680

[1] Part of town.

[2] Including 470 in the Metropolitan State Hospital and the Middlesex County Tuberculosis Hospital, authorized by Chapter 372 of the Acts of 1928 and Chapter 373 of the Acts of 1929.

METROPOLITAN SEWERS

Sewers Purchased and Constructed and Their Connections

During the year there have been 3.189 miles of Metropolitan sewers built within the sewerage districts, so that there are now 128.616 miles of Metropolitan sewers. Of this total, 9.642 miles of sewers, with the Quincy Pumping Station, have been purchased from cities and towns of the districts. The remaining 118.974 miles of sewers and other works have been constructed by the Metropolitan Boards.

The locations, lengths and sizes of these sewers are given in the following tables, together with other data referring to the public and special connections with the systems:

North Metropolitan Sewerage System

Location, Length and Sizes of Sewers, with Public and Special Connections

City or Town	Size of Sewers	Length in Miles	Public Connections, December 31, 1930	Special Connections: Character or Location of Connection	Special Connections: Number in Operation
Boston:					
Deer Island	4′ 0″ to 9′ 0″	1.653	4	– – –	–
East Boston	9′ 0″ to 1′ 0″	5.467	25	Shoe factory	1
				Middlebrook Wool-combing Co.	1
				Navy Yard	9
Charlestown	6′ 7″ x 7′ 5″ to 1′ 0″	3.292	15	Private building	1
				H. P. Hood & Sons, Inc.	1
				Club House	1
Winthrop	9′ 0″	2.864	14	Fire department station	1
				Private building	1
				Bakery	1
				Rendering Works	1
				Metropolitan Water Works blow-off	1
Chelsea	8′ 4″ x 9′ 2″ to 15″	5.230	14	Chelsea Water Works blow-offs	2
				Naval Hospital	1
				U. S. Lighthouse Service	1
				Metropolitan Water Works blow-off	1
				Cameron Appliance Co.	1
				Shultz-Goodwin Co.	1
Everett	8′ 2″ x 8′ 10″ to 4′ 8″ x 5′ 1″	2.925	9	Andrews-Wasgatt Co.	1
				National Metallic Bed Co.	1
				Linoide Co.	1
				Factory	2
				New England Structural Co.	1
				Beacon Oil Co.	1
				Everett Factories and Terminal Corp.	1
Lexington[1]	1′ 3″	–	1	– – –	–
				Metropolitan Water Works blow-offs	5
Malden	4′ 6″ x 4′ 10″ to 1′ 0″	5.844[2]	35	Private buildings	237[3]
				Factory	1
				Bakery	1
				Swift & Co.	1
				Holy Cross Cemetery office	1
Melrose	4′ 6″ x 4′ 10″ to 10″	6.099[4]	42	Private buildings	133[5]
				Factory	1
				Railroad station	1
				Park Department bath-house	1
				Harvard dormitories	2
				Slaughterhouse	1
Cambridge	5′ 2″ x 5′ 9″ to 1′ 3″	7.896	52	City Hospital	3
				Street Railway machine shop	1
				Private building	2
				Factory building	1
				Tannery	1
				Slaughterhouses (3)	1
				Carhouse	1
				Somerville Water Works blow-off	1
Somerville	6′ 5″ x 7′ 2″ to 10″	3.577	16	Street railway power house	1
				Stable	1
				Rendering works	1
				Railroad scale pit	1
				Private building	1

[1] The Metropolitan Sewer extends but a few feet into the town of Lexington.

[2] Includes 1.84 miles of sewer purchased from the city of Malden.

[3] Mostly buildings connected with sewers formerly belonging to city of Malden but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 215 of the Acts of 1898 and by the Metropolitan Water and Sewerage Board in accordance with Chapter 512 of the Acts of 1911 and made parts of the North Metropolitan Sewerage System.

[4] Includes 0.736 of a mile of sewer purchased from the city of Melrose.

[5] Mostly buildings connected with a sewer formerly belonging to the city of Melrose but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 414 of the Acts of 1896 and with a sewer extension built in accordance with Chapter 436 of the Acts of 1897 by the Metropolitan Sewerage Commission as an outlet for part of the town of Stoneham and made parts of the North Metropolitan Sewerage System.

North Metropolitan Sewerage System—*Concluded*

Location, Length and Sizes of Sewers, with Public and Special Connections—Concluded

City or Town	Size of Sewers	Length in Miles	Public Connections, December 31, 1930	Special Connections: Character or Location of Connection	Special Connections: Number in Operation
Medford	6′ 0″ x 6′ 3″ to 10″	7.530	27	Armory building	1
				Private buildings	9
				Stable	1
				Police substation	1
				Tanneries	6
				Private buildings	12
				Gelatine factory	1
				Watch-hand factory	1
				Stable	1
Winchester	4′ 6″ to 1′ 3″	10.420	33	Railroad station	3
				Felt works	1
				Town Hall	1
				Bay State Saw & Tool Co.	1
				Whitney Machine Co.	1
				Metropolitan Sewerage Division	1
				Water and Sewer Department	1
Stoneham	1′ 8″ to 10″	2.333	8	– – –	–
Woburn	2′ 6″ x 2′ 7″ to 1′ 3″	1.186	3	Glue factory	4
				Private building	1
				Private buildings	235[2]
				Railroad station	1
				Car house	3
				Post office	1
Arlington	3′ 0″ x 3′ 6″ to 10″	5.346[1]	63	Town of Arlington garage	1
				Town of Arlington workshop	1
				The Theodore SchwambCo.,Inc.	2
				Arlington Gas Light Co.	1
				Edison Transformer Station	1
Belmont	1′ 3″ to 2′ 6″	0.008	5	– – –	–
Wakefield	3′ 0″ to 2′ 0″ x 2′ 3″	0.703	1	– – –	–
Revere	4′ 0″ to 15″	0.136	3	– – –	–
Reading	1′ 4″ to 3′ 0″	0.055	1	– – –	–
		73.064[3]	371		728

[1] Includes 2.631 miles of sewer purchased from the town of Arlington.

[2] Mostly buildings connected with a sewer formerly belonging to the town of Arlington but later purchased by the Metropolitan Sewerage Commission in accordance with Chapter 520 of the Acts of 1897 and made a part of the North Metropolitan Sewerage System.

[3] Includes 2.787 miles of Mystic Valley Sewer in Medford and Winchester, running parallel with the Metropolitan Sewer.

South Metropolitan Sewerage System

Location, Length and Sizes of Sewers, with Public and Special Connections

City or Town	Size of Sewers	Length in Miles	Public Connections, December 31, 1930	Special Connections: Character or Location of Connection	Special Connections: Number in Operation
Boston:					
Back Bay	6′ 6″ to 3′ 9″	1.500[1]	16	Tufts Medical School	1
				Private house	1
				Administration Building, Boston Park Department	1
				Simmons College Buildings	1
				Art Museum	2
				Prince District Elementary School	1
				Private building	2
Brighton	7′ 0″ to 12″	6.035[2]	16	Abattoir	3
				Boston & Albany Railroad yard	2

[1] Includes 0.355 of a mile of sewer purchased from the city of Boston.

[2] Includes 0.446 of a mile of pipe and concrete sewers built for the use of the city of Boston; also 0.026 of a mile of sewer purchased from the town of Watertown.

South Metropolitan Sewerage System—*Concluded*

Location, Length and Sizes of Sewers, with Public and Special Connections —Concluded

City or Town	Size of Sewers	Length in Miles	Public Connections, December 31, 1930	Special Connections: Character or Location of Connection	Special Connections: Number in Operation
Dorchester	3′ x 4′ to 2′ 6″ x 2′ 7″	2.870[1]	14	Chocolate works	2
				Machine shop	1
				Paper Mill	1
				Private buildings	4
				Edison Electric Company Station	1
Hyde Park	10′ 7″ x 11′ 7″ to 4′ 0″ x 4′1″	4.527	19	Mattapan Paper Mills	2
				Private buildings	2
				Fairview Cemetery buildings	1
Roxbury	6′ 6″ x 7′ to 4′ 0″	1.430	–	–	–
West Roxbury	9′ 3″ x 10′ 2″ to 12″	7.643	23	Caledonia Grove buildings	1
				Parental School	1
				Lutheran Evangelical Church	1
				The Whittemore Co.	1
				Private buildings	6
Brookline	6′ 6″ x 7′ 0″ to 8″	2.540[2]	14	Private buildings	2
Dedham	4′ x 4′ 1″ to 2′ 9″ x 3′	5.012	8	Private buildings	2
				Dedham Carpet Mills	1
Hull[3]	60″ pipe	0.750	–	–	–
Milton	11′ x 12′ to 8″	5.823	30	Private buildings	3
Newton	4′ 2″ x 4′ 9″ to 1′ 3″	2.911	11	Private houses	14
				Laundry	1
Quincy	11′ 3″ x 12′ 6″ to 24″ pipe	7.392	24	Metropolitan Water Works blow-off	1
				Squantum schoolhouse	1
Waltham	3′ 6″ x 4′ 0″	0.001	1	–	–
Watertown	4′ 2″ x 4′ 9″ to 12″	0.750[4]	8	Private building	1
				Factories	2
				Stanley Motor Carriage Co.	1
				Knights of Pythias building	1
Needham	2′ 0″ x 2′ 3″ to 2′ 3″ x 2′ 6″	4.921	1	Walker Gordon Co.	2
				Private buildings	6
Wellesley[5]	2′ 0″ x 2′ 3″	–	1	–	–
Canton[6]	4′ 6″ x 5′ 0″ to 2′ 9″ x 3′ 0″	1.447	–	–	–
Norwood[6]	–	–	–	–	–
Stoughton[6]	–	–	–	–	–
Walpole[6]	–	–	–	–	–
Braintree[6]	–	–	–	–	–
		55.552	186		76

[1] Includes 1.24 miles of sewer purchased from the city of Boston.
[2] Includes 0.158 of a mile of pipe sewer built for the use of the town of Brookline.
[3] Hull is not a part of the Metropolitan Sewerage District.
[4] Includes 0.025 of a mile of sewer purchased from the town of Watertown.
[5] The Metropolitan Sewer extends but a few feet into the town of Wellesley.
[6] No Metropolitan trunk sewer has been completed to give these towns an outlet.

Information relating to areas, populations, local sewer connections and other data for the Metropolitan sewerage districts appears in the following table:

North Metropolitan Sewerage District

Area (Square Miles)	Estimated Total Population	Miles of Local Sewer Connected	Estimated Population Contributing Sewage	Ratio of Contributing Population to Total Population (Per Cent)	Connections made with Metropolitan Sewers: Public	Connections made with Metropolitan Sewers: Special
100.32	739,720	949.54	685,720	92.7	371	728

South Metropolitan Sewerage District

201.47	722,960	926.46	534,930	74.0	186	76

Both Metropolitan Sewerage Districts

301.79	1,462,680	1,876.00	1,220,650	83.5	557	804

Of the estimated gross population of 1,462,680 on December 31, 1930, 1,220,650 representing 83.5 per cent, were on that date contributing sewage to the Metropolitan sewers, through a total length of 1,876 miles of local sewers owned by the individual cities and towns of the districts.

These sewers are connected with the Metropolitan Systems by 557 public and 804 special connections. During the current year there has been an increase of 53.14 miles of local sewers connected with the Metropolitan Systems, and 7 public and 17 special connections have been added.

CONSTRUCTION

NORTH METROPOLITAN SEWERAGE SYSTEM

Malden, Revere and Everett Surface Drainage System

Chapter 456 of the Acts of 1924 directed the Metropolitan District Commission to construct a surface water drainage channel to improve a low area lying in the cities of Malden, Revere and Everett. Surveys and land takings were completed and work was started on construction plans and field work on July 12, 1926. A temporary injunction by the Supreme Court was placed on the further carrying on of this work, which ceased on July 28, 1926, pending the decision of the Court on the question before it.

The Court has rendered a decision in favor of the completion of the work. For report of this work, see the Metropolitan Park Engineer's report.

SOUTH METROPOLITAN SEWERAGE SYSTEM

New Neponset Valley Sewer

Work has been continued in the matter of surveys and borings. Contracts for the building of Sections 107 and 108 have been completed.

During the year additional contracts have been entered into for the construction of Sections 111, 112, 113, 114, 115 and 116 of this trunk sewer.

New Neponset Valley Sewer—Sections 109 and 110

Section 109 was let to the V. Barletta Company under contract No. 36 dated December 5, 1929.

Section 110 was let to the J. H. Ferguson Company under contract No. 37, dated February 12, 1930.

These contracts were let at a very low figure as the contractors from an examination of the boring samples thought they could excavate by the ordinary modern methods. It was found, however, when work was started that the material was very compact and could not be excavated by clamshell buckets as expected. These sections were of great depth, ranging from 23 feet to 45 feet. It was soon apparent that this work could not be completed for the prices bid for under the contracts and that the contractors would suffer heavy losses because of the unexpected increase in the cost of excavation. The contractors made application to the Commission for relief. After careful consideration, the Commission decided to terminate these contracts and to re-advertise the work.

On Section 109, about 1,500 feet of sewer were completed under the original contract. On Section 110, about 300 feet of sewer were partially completed under the original contract.

Bids were called for and new awards were made, Section 109 being re-let under Contract No. 36A to the V. Barletta Company who were the low bidders. Section 110 was re-let under Contract No. 37A to the J. H. Ferguson Company who were the low bidders.

A description of the original contract for Section 109 was given in last year's report. Work was continued on this section under the original contract up to November 15, 1930, when the contract was terminated.

The original contract for Section 110 had the following particulars:

Date of Contract No. 37 (Sewerage Division), February 12, 1930.

Name of contractor, J. H. Ferguson Company.

Length of section, 3,180 feet.
Dimensions of concrete sewer, 72 inches by 75 inches.
Depth of excavation, 20 feet to 41 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work was started on this section March 11, 1930. This contract terminated October 23, 1930.

New Neponset Valley Sewer—Part of Section 109

Date of contract No. 36A (Sewerage Division), November 13, 1930.
Name of contractor, V. Barletta Company.
Length of (part of) section, 2,950 feet.
Dimensions of concrete sewer, 72 inches by 75 inches.
Depth of excavation, 25 feet to 45 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
At the present time on this section under this contract about 300 feet of trench have been excavated to grade, but no sewer has been laid. The only difficulties encountered in the work are those incident to its depth.

New Neponset Valley Sewer—Part of Section 110

Date of Contract No. 37A (Sewerage Division), November 13, 1930.
Name of contractor, J. H. Ferguson Company.
Length of (part of) section, 3,180 feet.
Dimensions of concrete sewer, 72 inches by 75 inches.
Depth of excavation, 20 feet to 41 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
At the present time on this section under this contract about 150 feet of trench have been excavated to grade but no sewer has been laid. Considerable difficulty has been encountered in the excavation owing to the wet sand and great depth.

New Neponset Valley Sewer—Section 111

Date of contract No. 38 (Sewerage Division), April 11, 1930.
Name of contractor, Frank W. Christy.
Length of section, 5,600 feet.
Dimensions of concrete sewer, 54 inches by 60 inches.
Depth of excavation, 13 feet to 22 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work was started on this section April 18, 1930, and 3,260 feet of sewer have been completed. Considerable difficulty has been encountered with the boiling sands and with a large amount of ground water.

New Neponset Valley Sewer—Section 112

Date of contract No. 39 (Sewerage Division), April 14, 1930.
Name of contractor, C. & R. Construction Company.
Length of section, 5,700 feet.
Dimensions of concrete sewer, 54 inches by 60 inches.
Depth of excavation, 13 feet to 15 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work was started on this section May 20, 1930, and has been carried on without any unlooked for difficulties. 2,910 feet of sewer have been completed. The excavation has been in wet sand.

New Neponset Valley Sewer—Section 113

Date of contract No. 41 (Sewerage Division), June 19, 1930.
Name of contractor, Anthony Baruffaldi.
Length of section, 5,300 feet.
Dimensions of concrete sewer, 54 inches by 60 inches.
Depth of excavation, 10 feet to 20 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.

Work was started on this section June 25, 1930. No unexpected difficulties have been encountered. 3,050 feet of sewer have been completed. Excavation has been in wet sand.

New Neponset Valley Sewer—Section 114

Date of contract No. 42 (Sewerage Division), October 23, 1930.
Name of contractor, V. Barletta Company.
Length of section, 5,800 feet.
Dimensions of concrete sewer, 54 inches by 60 inches.
Depth of excavation, 9 feet to 23 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work was started on this section October 28, 1930. Considerable difficulty in excavating and placing of foundation was encountered in the work, owing to boiling sands. 440 feet of sewer have been completed.

New Neponset Valley Sewer—Section 115

Date of contract No. 43 (Sewerage Division), October 16, 1930.
Name of contractor, A. D. Daddario.
Length of section, 6,050 feet.
Dimensions of concrete sewer, 54 inches by 60 inches and 33 inches by 36 inches.
Depth of excavation, 7 feet to 9 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work was started on this section November 3, 1930, and 550 feet of sewer have been completed. Owing to the shallowness of the cut, no difficulty has been encountered in the excavation.

New Neponset Valley Sewer—Section 116

Date of contract No. 44 (Sewerage Division), December 24, 1930.
Name of contractor, A. D. Daddario.
Length of section, 5,200 feet.
Dimensions of concrete sewer, 54 inches by 60 inches and 36-inch cast iron pipe siphon.
Depth of excavation, 5 feet to 17 feet.
Assistant Engineer in immediate charge of the section, Seth Peterson.
Work has not been started on this section.

New Neponset Valley Sewer—Remaining Sections

There remain to be constructed on this line five sections, two of which, Sections 117 and 118, will be in Norwood and three, Sections 119, 120 and 121, will be in Canton. Surveys and borings on this work have been largely completed and contracts will be let early in the coming year.

Massachusetts Air Terminal and Arena, Incorporated

At the request of the Massachusetts Air Terminal and Arena, Incorporated, which is building an extensive airport in this vicinity which will cover the territory in which the Metropolitan Sewers are built, siphons have been constructed beneath the Metropolitan Sewer at Stations 27+50 and 41+0 of Section 115, for drainage purposes.

Braintree–Weymouth Branch

By Chapter 546 of the Acts of 1910, Braintree was made a part of the South Metropolitan Sewerage District subject to the approval of said Act by the voters of the town of Braintree. This Act was approved at the town meeting held March 11, 1929. At the passage of the Act, it was intended to take the sewage from Braintree to the High-level Sewer entering at or about the junction of Hancock and Greenleaf Streets, Quincy. This Act was amended by Chapter 398 of the Acts of 1930.

By Chapter 419 of the Acts of 1930, Weymouth was made a part of the South Metropolitan Sewerage District on condition that the Act should be accepted by the town meeting members of said town not later than May 1, 1931. This Act has not yet been accepted by the town.

By Chapter 398 of the Acts of 1930, we were directed to change the route of the Braintree branch in such manner as to accommodate the town of Weymouth which it was felt must at some time become a part of the District and also combine this project with the drainage of a certain part of the city of Quincy, which was to be provided for under the terms of the original High-level Sewer Act and for which an appropriation under Chapter 240 of the Acts of 1928 was made.

A branch engineering office has been established in Quincy as headquarters for engineering parties engaged in surveys and studies in connection with this work. Borings have been made and considerable preliminary work has been completed. This work will include the construction of a pumping station on lands of the Commonwealth on the easterly side of the High-level Sewer in the vicinity of Palmer Street, Quincy. No contracts have yet been awarded on this project. This work is in charge of Benjamin Rubin, Assistant Engineer.

MAINTENANCE

Scope of Work and Force Employed

The maintenance of the Metropolitan Sewerage System includes the operation of 8 pumping stations, the Nut Island screen-house and 128.616 miles of Metropolitan sewers, receiving the discharge from 1,876 miles of town and city sewers at 1,361 points, together with the care and study of inverted siphons under streams and in the harbor.

At present the permanent maintenance forces consists of 190 men, of whom 119 are employed on the North System and 71 on the South System. These are subdivided as follows: North Metropolitan System, 75 engineers and other employees in the pumping stations and 44 men, including foremen, on maintenance, care of sewer lines, buildings and grounds; South Metropolitan System, 46 engineers and other employees in the pumping stations and 25 men, including foremen, on maintenance, care of sewer lines, buildings and grounds.

The regular work of this department, in addition to the operation of the pumping stations, has consisted of routine work of cleaning and inspecting sewers and siphons, caring for tide gates, outfall sewers, regulators and overflows, measuring flow in sewers, inspection of connections to the Metropolitan sewers, and the care of pumping stations and other buildings, grounds and wharves.

In addition to these regular duties, other work has been done by the maintenance employees in this department as follows:

East Boston Pumping Station

At the time of the destruction of the East Boston Pumping Station by fire, which destroyed the city of Chelsea in 1908, considerable damage was done to the machinery in the station. The high pressure cylinder on engine No. 2 was cracked at this time. It has been repaired at various times, but finally it became practically useless. A new high pressure cylinder purchased from the Allis-Chalmers Manufacturing Company was installed.

The No. 1 pump at this station also received extensive repairs. These consisted of the installation of a new impeller wheel, a new steady bearing, a new shaft and a new brass sleeve together with repairs on the pump casing. This work was done by the maintenance employees.

Deer Island Pumping Station

The dwelling house at Deer Island was constructed in 1895. At that time it was covered with a shingle roof. A new slate and copper roof has been put on this building, also new gutters, down-spouts and valleys.

A new skylight was put in the roof over the machine shop at this station. This work was done by contract.

The dwelling house was painted outside.

Repairs were made to engine No. 3 at this station consisting of re-turning the shaft and re-setting the impeller wheel which had become loosened. A new brass sleeve was placed on the shaft.

This work was done by the maintenance employees.

Alewife Brook Pumping Station

In this station were two small electric lighting units. These were put in when the station was built. The engines had become badly worn. Because of lack of room in this station, it was decided to remove these units and use the Edison Electric Illuminating Company's current, which is now in service at this plant.

The water for the condensers at this station is taken from the Alewife River. At times with the river drawn down, it has been impossible to procure condenser water from this source thereby necessitating the use of water from the public water supply. A new 6-inch cast iron pipe has been laid from the river to the pumping station at such an elevation that water can be obtained from this source at all times.

This work was done by the maintenance employees.

Harvard College Service Tunnel

In connecting two buildings belonging to Harvard College in Cambridge by means of a service tunnel, it was necessary to cross the Metropolitan Sewer at two places. Portions of a new Metropolitan Sewer were built at these crossings in order not to disturb the service tunnel at such time as a new Metropolitan Sewer shall be built in this district. These portions of sewer are 3 feet 6 inches in diameter, are located on the northerly side of the existing Metropolitan Sewer and extend from Station 13+05 to Station 13+44 and from Station 17+71 to Station 18+23 of Section 30. They are closed temporarily by bulkheads. This work was done by and at the expense of Harvard College.

Ward Street Pumping Station

At this station a new 36-inch ventilator was installed in the roof of the boiler house.

The original boiler plant at this station was installed in 1904. Two of these boilers were replaced during the year by boilers of the same general type having corrugated furnaces, thereby doing away with staybolts. These were built and installed by the International Engineering Works, Incorporated, of Framingham, Massachusetts.

Exchange of Land with Wentworth Institute

The Wentworth Institute, which owns land adjoining the Ward Street Pumping Station grounds, made an arrangement with the Metropolitan District Commission whereby an exchange of land occurred. This was done at the request of the Trustees of the said Institute for the purpose of improving the form of their recreation field. Approximately the same number of feet of land was taken from our premises as was added by a grant from the said Institute. By this exchange we acquired about 10 feet of additional frontage on Ward Street. This exchange necessitated the moving of the locker building and of the stable and storehouse building, all of which was done by and at the expense of the Wentworth Institute Trustees. No monetary consideration was paid by either party.

Nut Island Screen-house

The dwelling house, the screen-house building, the stable and locker buildings at this station were painted during the year.

In addition to the regular maintenance work at this station and at the Hough's Neck Pumping Station, the employees of this station have made 4,148 pounds of brass castings for the different pumping stations of the Sewerage Systems. A large amount of expert machine work has been done here for other stations.

Gasolene in Public Sewers

During the year the usual precautions have been maintained against the introduction of gasolene into the Metropolitan sewers. An inspector who covers both North and South Metropolitan Sewerage Districts has been employed. His duties are to see that all newly constructed garages or other gasolene-using establishments are supplied with a proper gasolene separator and also to see that these separators are kept in working condition.

During the year 1930 the number of permits issued by the municipalities in the Sewerage Districts for the construction of garages and other places where gasolene is used was 457. Each of these permits necessitates an examination by our inspector. Many of them are attended to through the mails and do not require a personal visit. Visits are made, however, to all locations where a connection is to be made with the public sewerage system and to such places as do not respond to the return postal cards sent out. During the year 30 such places were connected with the sewers that empty into the Metropolitan Systems. At the present time, there are, according to our records, 1,583 garages and other establishments where gasolene is used connected with the local sewerage systems which discharge into the Metropolitan sewers.

This system of inspection has improved the gasolene situation in regard to the danger to the sewers. Occasionally odors of gasolene are detected in the sewers. These are reported to the Public Safety Department, which alone has statutory control of the distribution and handling of gasolene in the Commonwealth.

North Metropolitan Sewerage System

Table showing Cities and Towns delivering Sewage to this System; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Populations on Such Areas; Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Populations estimated as of December 31, 1930]

Cities and Towns	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection[1]	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
							Sq. Miles	Sq. Miles	Per Cent.	Per Cent.
Boston (Deer Island)	0.70	Separate	–	–	950[2]	950	–	–	–	–
Winthrop	33.30	Separate	3,777	4.4	16,620	16,980	1.41	1.61	97.9	87.6
Boston (East Boston)	34.72	Separate and combined	5,464	10.6	57,920	60,500	1.20	2.18	95.7	55.0
Chelsea	32.78	Separate and combined	4,818	9.4	45,290	46,070	1.21	2.24	98.3	54.0
Everett	53.45	Separate and combined	6,606	7.3	48,220	49,270	2.15	3.34	97.9	64.4
Malden	76.84	Separate	9,271	6.2	57,480	59,010	3.40	5.07	97.4	67.1
Melrose	49.31	Separate	4,851	4.6	22,310	23,600	2.23	3.73	94.5	59.8
Boston (Charlestown)	21.97	Separate and combined	5,596	5.6	31,340	31,700	0.67	1.27	98.9	52.8
Cambridge	164.55	Separate and combined	18,977	5.95	112,910	113,800	5.17	6.11	99.2	84.6
Somerville	106.41	Separate and combined	17,878	5.75	102,800	104,740	3.67	3.96	98.1	92.7
Medford	89.58	Separate	10,076	6.0	60,460	61,390	4.21	8.35	98.5	50.4
Winchester	42.46	Separate	2,842	4.45	12,650	12,880	2.00	5.95	98.2	33.6
Woburn	21.94	Separate	1,686	5.6	9,440	19,540	1.14	12.71	48.3	9.0
Stoneham	18.28	Separate	1,439	4.5	6,480	10,180	0.96	5.50	63.7	17.5
Arlington	56.73	Separate	5,626	5.8	32,630	37,580	2.71	5.20	86.8	52.1
Belmont	42.80	Separate	3,185	6.5	21,230[3]	22,610	2.06	4.66	93.9	44.2
Wakefield	24.82	Separate	1,560	5.1	7,960	16,460	1.05	7.65	48.4	13.7
Lexington	15.43	Separate	641	4.0	2,560[4]	6,300	0.89	5.11	40.6	17.4
Revere	52.62	Separate	5,239	6.6	34,580	36,220	2.48	5.86	95.5	42.3
Reading	10.85	Separate	460	4.1	1,890	9,940	0.52	9.82	19.0	5.3
Totals	949.54	– – –	109,992	6.2	685,720	739,720	39.13	100.32	92.7	39.0

[1] Estimated from Assessors' statement of the number of houses in each city or town on April 1, 1930, and the population from census of 1930.
[2] Estimated by Superintendent of the Institution on Deer Island.
[3] Including 2 connections with McLean Hospital, having an estimated population of 531.
[4] Part of town not included in Metropolitan Sewerage District.

South Metropolitan Sewerage System

Table showing Cities and Towns delivering Sewage to this System; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Populations on Such Areas; Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Populations estimated as of December 31, 1930]

Cities and Towns	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection[1]	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
							Sq. Miles	Sq. Miles	Per Cent.	Per Cent.
Boston (Back Bay)	27.83	Separate and combined	2,229	20.35	45,360	45,640	1.17	1.61	99.4	72.7
Boston (Brighton)	72.80	Separate and combined	5,902	10.5	61,970	62,200	3.37	3.74	99.6	90.1
Brookline	91.03	Separate and combined	6,962	6.9	48,040	48,360	4.13	6.81	99.3	60.6
Newton	176.09	Separate	12,327	5.3	65,330	66,800	9.15	16.88	97.8	54.2
Watertown	65.25	Separate	5,866	6.0	35,200	36,040	2.88	4.04	97.7	71.3
Waltham	60.45	Separate	5,076	7.7	39,560[7]	40,290[7]	3.39	13.63	98.2	24.9
Boston (Dorchester)	71.90	Separate and combined	8,189	9.3	76,160[2]	106,500[2]	2.92	4.89	71.5	59.7
Milton	30.36	Separate and combined	2,311	4.5	10,400[2]	16,950[2]	1.36	12.59	61.4	10.8
Boston (Hyde Park)	42.41	Separate	3,331	6.5	21,650	21,950	1.91	4.57	98.6	41.8
Dedham	21.91	Separate	1,372	4.8	6,590	14,550[3]	1.05	9.40	45.3	11.2
Boston (Roxbury)[4]	–	–	–	–	–	53,500[2]	–	1.23	–	–
Boston (West Roxbury)	88.99	Separate and combined	7,192	6.0	45,860[2,5]	61,000[2]	3.65	8.92	75.2	40.9
Quincy	130.40	Separate	12,098	5.9	71,380	73,590	5.01	12.56	97.0	39.9
Wellesley	33.81	Separate	1,423	4.1	5,830	11,750	1.95	9.89	49.6	19.7
Needham	13.23	Separate	371	4.3	1,600	11,100	0.62	12.50	14.4	5.0
Canton[6]	–	–	–	–	–	5,820	–	17.84	–	–
Norwood[6]	–	–	–	–	–	15,180	–	10.16	–	–
Stoughton[6]	–	–	–	–	–	8,260	–	16.23	–	–
Walpole[6]	–	–	–	–	–	7,390	–	20.54	–	–
Braintree[6]	–	–	–	–	–	16,090	–	13.44	–	–
Totals	926.46	–	–	74,649	7.2	534,930	722,960	42.56	201.47	74.0	21.1

[1] Estimated from Assessors' statement of the number of houses in each city or town on April 1, 1930, and the population from census of 1930.

[2] Parts of Dorchester, Milton, Roxbury and West Roxbury which are situated within the South Metropolitan Sewerage System limits are tributary at present to Boston main drainage works.

[3] Part of town not included in Metropolitan Sewerage District.

[4] At present connected with Boston main drainage system.

[5] Including connection with institution at Austin Farm, having an estimated population of 2,709.

[6] No Metropolitan trunk sewer has been completed to give these towns an outlet.

[7] Including connections with the Metropolitan State Hospital and the Middlesex County Tuberculosis Hospital authorized by chapter 372 of the Acts of 1928, and chapter 373 of Acts of 1929, having an estimated population of 470.

Both Metropolitan Sewerage Systems

Table showing Areas delivering Sewage to both Systems; Approximate Miles of Sewers connected; Estimated Populations and Areas now contributing; Total Areas ultimately to contribute, and Present Populations on Such Areas. Ratios of Present Contributing Areas to Ultimate Areas, and Ratios of Populations now contributing to Present Total Populations.

[Population estimated as of December 31, 1930]

Systems	Miles of Local Sewers Connected	Separate or Combined	Number of Connections with Local Sewers	Estimated Number of Persons Served by Each House Connection	Estimated Population Now Contributing Sewage	Estimated Present Total Population	Estimated Area Now Contributing Sewage	Area Ultimately to Contribute Sewage	Ratio of Contributing Population to Present Total Population	Ratio of Contributing Area to Ultimate Area
							Sq. Miles	Sq. Miles	Per Cent.	Per Cent.
North Metropolitan . .	949.54	Separate and combined	109,992	6.2	685,720	739,720	39.13	100.32	92.7	39.0
South Metropolitan . .	926.46	Separate and combined	74,649	7.2	534,930	722,960	42.56	201.47	74.0	21.1
Totals . . .	1,876.00	– – –	184,641	6.6	1,220,650	1,462,680	81.69	301.79	83.5	27.1

PUMPING STATIONS

Capacities and Results

North Metropolitan System

Deer Island Pumping Station

At this station are four submerged centrifugal pumps with impeller wheels 8.25 feet in diameter, driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 100,000,000 gallons, with 19-foot lift.
Contract capacity of 3 pumps: 45,000,000 gallons each, with 19-foot lift.
Average coal duty for the year: 60,700,000 foot pounds.
Average quantity raised each day: 77,100,000 gallons.
Maximum quantity raised per day: 130,400,000 gallons.

East Boston Pumping Station

At this station are four submerged centrifugal pumps, with impeller wheels 8.25 feet in diameter, driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 100,000,000 gallons with 19-foot lift.
Contract capacity of 3 pumps: 45,000,000 gallons each, with 19-foot lift.
Average coal duty for the year: 71,100,000 foot pounds.
Average quantity raised each day: 75,100,000 gallons.
Maximum quantity raised per day: 128,400,000 gallons.

Charlestown Pumping Station

At this station are three submerged centrifugal pumps, two of them having impeller wheels 7.5 feet in diameter, the other 8.25 feet in diameter. They are driven by triple-expansion engines of the Reynolds-Corliss type.

Contract capacity of 1 pump: 60,000,000 gallons with 8-foot lift.
Contract capacity of 2 pumps: 22,000,000 gallons each, with 11-foot lift.
Average coal duty for the year: 51,100,000 foot pounds.
Average quantity raised each day: 41,100,000 gallons.
Maximum quantity raised per day: 69,300,000 gallons.

Alewife Brook Pumping Station

The pumping units in this station consist of one Andrews pump driven by a compound marine engine, one Morris pump and Morris compound engine and a specially designed engine of vertical cross-compound type having between the cylinders a centrifugal pump rotating on a horizontal axis.

Contract capacity of the Andrews pump: 4,500,000 gallons with 13-foot lift.
Contract capacity of Morris pump: 8,000,000 gallons with 15-foot lift.
Contract capacity of the special pump: 13,000,000 gallons with 13-foot lift.
Average coal duty for the year: 19,600,000 foot pounds.
Average quantity raised each day: 5,480,000 gallons.
Maximum quantity raised per day: 10,000,000 gallons.

Reading Pumping Station

At this station are two submerged centrifugal pumps, one of 2,500,000 gallons per 24 hours, and one of 4,000,000 gallons per 24 hours, capacity. These operate against a maximum head of 65 feet, and are actuated by vertical shafts directly connected with 75 and 100 horse-power motors. Alternating current of 440 volts furnished by the town of Reading is used.

Average quantity pumped per 24 hours: 828,000 gallons.
Maximum quantity raised per day: 1,840,000 gallons.

South Metropolitan System

Ward Street Pumping Station

At this station are two vertical, triple-expansion pumping engines, of the Allis-Chalmers type, operating reciprocating pumps, the plungers of which

are 48 inches in diameter with a 60-inch stroke and one 50,000,000-gallon centrifugal pumping unit actuated by a 500 H.P. Uniflow engine.

Contract capacity of 3 pumps: 50,000,000 gallons each, with 45-foot lift.
Average coal duty for the year: 79,000,000 foot pounds.
Average quantity raised each day: 33,500,000 gallons.
Maximum quantity raised per day: 52,500,000 gallons.

Quincy Pumping Station

The plant at this station consists of one compound condensing Deane duplex piston pumping unit and one Lawrence centrifugal pump driven by a Sturtevant compound condensing engine and one Morris centrifugal pump driven by a Morris compound condensing engine.

Contract capacity of 3 pumps: Morris centrifugal, 10,000,000 gallons; Deane, 5,000,000 gallons; Lawrence centrifugal, 10,000,000 gallons.
Average coal duty for the year: 31,300,000 foot pounds.
Average quantity raised each day: 5,900,000 gallons.
Maximum quantity raised per day: 13,200,000 gallons.

Nut Island Screen-house

The plant at this house includes two sets of screens in duplicate actuated by small reversing engines of the Fitchburg type. Two vertical Deane boilers, 80 horse-power each, operate the engines, provide heat and light for the house, burn materials intercepted at the screens, and furnish power for the Hough's Neck pumping station.

Average daily quantity of sewage passing screens: 61,000,000 gallons.
Maximum quantity passing screens per day: 166,000,000 gallons.

Hough's Neck Pumping Station

At this station are two 6-inch submerged Lawrence centrifugal pumps with vertical shafts actuated by two Sturtevant direct-current motors.

The labor and electric energy for this station are supplied from the Nut Island Screen-house, and as used at present it does not materially increase the amount of coal used at the latter station.

Average quantity raised each day: 222,000 gallons.
Maximum quantity raised per day: 478,000 gallons.

Average Daily Volume of Sewage lifted at Each of the Eight Metropolitan Sewerage Pumping Stations during the Year, as compared with the Corresponding Volumes for the Previous Year

Pumping Station	Average Daily Pumpage			
	Jan. 1, 1930, to Dec. 31, 1930	Jan. 1, 1929, to Dec. 31, 1929	Increase during the Year	
	Gallons	Gallons	Gallons	Per Cent
Deer Island	77,100,000	84,700,000	7,600,000[1]	8.97[1]
East Boston	75,100,000	82,700,000	7,600,000[1]	9.19[1]
Charlestown	41,100,000	43,300,000	2,200,000[1]	5.08[1]
Alewife Brook	5,480,000	6,730,000	1,250,000[1]	18.57[1]
Reading	828,000	870,000	42,000[1]	4.83[1]
Quincy	5,900,000	7,200,000	1,300,000[1]	18.06[1]
Ward Street (actual gallons pumped)	33,500,000	36,500,000	3,000,000[1]	8.22[1]
Hough's Neck	222,000	243,000	21,000[1]	8.64[1]

[1] Decrease.

Metropolitan Sewerage Outfalls

The Metropolitan Sewerage Districts now have outfalls in Boston Harbor at five points, two of which may discharge sewage from the North District and three from the South District.

An examination of the outfalls of both North and South Systems was made by a diver. These structures were found to be in good condition. Some of the outlet openings at Deer Island outfall were found to be partially stopped up. These were cleaned out.

During the year the sewage of the North District has been discharged wholly through the outlet located near Deer Island light. The other outfall of this system is closed by a cast-iron cover which can easily be removed.

Of the outfalls of the South District two extend for a distance exceeding one mile from the shore of Nut Island, Quincy, and the third one, called an emergency outlet, extends about 1,500 feet from the same. It was necessary to discharge sewage through this outfall eleven hours during the year.

During the year the average flow through the North Metropolitan District outfall at Deer Island has been 77,100,000 gallons of sewage per 24 hours, with a maximum rate of 130,400,000 gallons during a stormy period in March, 1930. The amount of sewage discharged into the North Metropolitan District averaged 112 gallons per day for each person, taking the estimated population of the District contributing sewage. If the sewers in this District were restricted to the admission of sewage proper only, this per capita amount would be considerably decreased.

In the South Metropolitan District an average of 61,000,000 gallons of sewage per 24 hours has passed through the screens at the Nut Island Screen-house and has been discharged from the outfalls into the outer harbor. The maximum rate of discharge per day which occurred during a stormy period in February, 1930, was 166,000,000 gallons. The discharge of sewage through these outfalls represents the amount of sewage contributed by the South Metropolitan District, which was at the rate of 114 gallons per day per person of the estimated number contributing sewage in the District.

The daily discharge of sewage per capita is larger in the South District than it is in the North District because, owing to the large size and unused capacity of the South District High-level Sewer, more storm water is at present admitted to the sewers of this District.

Material Intercepted at the Screens

The material removed from the sewage at the screens of the North Metropolitan Sewerage Stations, consisting of rags, paper and other floating materials, has during the year amounted to 1,921 cubic yards. This is equivalent to 1.84 cubic feet for each million gallons of sewage pumped at Deer Island.

The material removed from the sewage at the screens of the South Metropolitan Sewerage Stations amounted to 4,352 cubic yards, equal to 5.28 cubic feet per million gallons of sewage delivered at the outfall works at Nut Island.

Studies of sewage flows in the Metropolitan sewers and siphons indicate that they are free from deposit.

Frederick D. Smith,
Director and Chief Engineer of Sewerage Division.

Boston, January 1, 1931.

FINANCIAL STATEMENT

OF THE

METROPOLITAN DISTRICT COMMISSION

FOR THE YEAR ENDING NOVEMBER 30, 1930

GENERAL

HEADQUARTERS BUILDING CONSTRUCTION FUND

Chapter 362, Acts of 1929			$750,000 00
	Expenditures		
Construction:			
Contracts:			
Atlantic Building Wrecking Co.	$1,050 00		
Coleman Bros.	259,119 10		
A. B. See Elevator Co.	41,375 54		
Lord Electric Co.	24,650 00		
Thomas J. Murphy Co.	21,165 00		
Acme Heating & Ventilating Co.	17,164 90		
Edison Electric Illuminating Co.	119 80		
		$364,644 34	
Architect services		27,766 53	
Land and property		118,512 59	
Advertising		322 65	
Borings		113 25	
Miscellaneous services		675 00	
			$512,034 36
Amounts charged to Nov. 30, 1929			7 20
			512,041 56
Balance, Dec. 1, 1930			$237,958 44

PARKS DIVISION

Construction

METROPOLITAN PARKS CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929		$9,093,043 96
Receipts added before June 1, 1901		198,942 81
		$9,291,986 77
Expenditures		
Amounts charged to Nov. 30, 1930		9,263,603 93
Balance, Dec. 1, 1930		$28,382 84

METROPOLITAN PARKS CONSTRUCTION FUND, SERIES II

Total amount authorized to Dec. 1, 1929		$9,613,749 63
Receipts from sales, etc.		29,934 16
Chapter 115, Acts of 1930		750 00
Chapter 426, Acts of 1930		281 00
		$9,644,714 79
Expenditures		
Quannapowitt Parkway:		
Construction:		
Labor and materials	$5 00	
Engineering:		
Expense	80	
		$5 80
Furnace Brook Parkway:		
Land	$5,905 00	
Legal:		
Services	$118 00	
Expenses	18 63	
	136 63	
		6,041 63
Neponset Bridge:		
Construction:		
Labor and materials		2,140 90

Metropolitan Parks Construction Fund, Series II—Concluded

Street or Way in Brookline:				
Land		$31,138 01		
Construction:				
Contract, University Excavating Co.	$7,029 87			
Labor and materials	29 60			
		7,059 47		
Engineering:				
Expenses		2 40		
Legal:				
Services	$85 27			
Expenses	190 07			
		275 34		
Appraising		1,450 00		
Claims		850 00		
Interest		1,189 58		
Miscellaneous		10 00		
			$41,974 80	
West Street, Braintree:				
Chapter 235, Acts of 1916, reverted			8,261 75	
			$58,424 88	
Amounts charged to Nov. 30, 1930			9,566,719 10	
				$9,625,143 98
Balance, Dec. 1, 1930				$19,570 81

CHARLES RIVER BASIN CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929	$4,500,000 00
Receipts to Dec. 1, 1929	9,368 91
	$4,509,368 91
Expenditures	
Amounts charged to Nov. 30, 1930	4,472,922 22
Balance, Dec. 1, 1930	$36,446 69

MASSACHUSETTS AVENUE BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929	$600,000 00
Expenditures	
Amounts charged to Nov. 30, 1930	522,297 25
Balance, Dec. 1, 1930	$77,702 75

NORTHERN TRAFFIC ROUTE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929			$3,000,000 00
Receipts trans. from Northern Traffic Artery Betterment Assessments and Sales Fund			18,140 30
			$3,018,140 30
Expenditures			
Land		$37,500 00	
Legal:			
Services		16 60	
Appraising		150.00	
Claims		275 00	
		37,941 60	
Transfer from Northern Traffic Artery Betterment Assessments and Sales Fund		1,243 00	
		39,184 60	
Amounts charged to Nov. 30, 1929		2,886,861 86	
			2,926,046 46
Balance, Dec. 1, 1930			$92,093 84

NORTHERN TRAFFIC ARTERY BETTERMENT ASSESSMENTS AND SALES

Receipts:			
For the year ending Nov. 30, 1930	$2,482 20		
For the period prior to Dec. 1, 1929	122,168 56		
		$124,650 76	
Transfer to Northern Traffic Route Construction Fund		18,140 30	
			$106,510 46
Expenditures:			
For the year ending Nov. 30, 1930		40	
For the period prior to Dec. 1, 1929		$106,510 06	
			106,510 46

BROOKLINE STREET, ESSEX STREET, COTTAGE FARM BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929	$1,850,000 00
Expenditures	
Amounts charged to Nov. 30, 1930	1,760,062 28
Balance, Dec. 1, 1930	$89,937 72

WESTERN AVENUE, ARSENAL STREET BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929		$200,000 00
Expenditures		
Amounts charged to Nov. 30, 1930		192,929 16
Balance, Dec. 1, 1930		$7,070 84

WESTERN AVENUE BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929		$325,000 00
Expenditures		
Amounts charged to Nov. 30, 1930		305,186 35
Balance, Dec. 1, 1930		$19,813 65

RIVER STREET, BRIGHTON STREET BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929		$310,000 00
Expenditures		
Amounts charged to Nov. 30, 1930		304,685 17
Balance, Dec. 1, 1930		$5,314 83

NEWTON–WELLESLEY BRIDGE CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929		$50,000 00
Receipts:		
For the year ending Nov. 30, 1930	$174 04	
For the period prior to Dec. 1, 1929	1,529 44	
		1,703 48
		$51,703 48
Expenditures		
Refund to Newton and Wellesley	$8,227 43	
Amounts charged to Nov. 30, 1929	41,772 57	
		50,000 00
Balance, Dec. 1, 1930		$1,703 48

CHARLES RIVER BASIN IMPROVEMENTS

Chapter 371, Acts of 1929			$2,305,000 00
Expenditures			
Construction:			
Labor and materials		$30,426 81	
Engineering:			
Services	$9,858 03		
Expenses	220 04		
		10,078 07	
Legal:			
Services	$709 98		
Expenses	3 02		
		713 00	
Appraising		625 00	
Architect services		1,832 08	
Advertising		48 75	
		$43,723 71	
Amounts charged to Nov. 30, 1929		12,162 68	
			55,886 39
Balance, Dec. 1, 1930			$2,249,113 61

Miscellaneous

METROPOLITAN PARKS EXPENSE FUND

Receipts, December 1, 1929, to Nov. 30, 1930:			
Bath Houses:			
Revere Beach:			
Sale of tickets	$23,413 15		
Privileges	396 00		
Miscellaneous	16 00		
		$23,825 15	
Nantasket Beach:			
Sale of tickets	$13,282 50		
Privileges	124 20		
Miscellaneous	4 00		
		13,410 70	
Nahant Beach:			
Sale of tickets	$8,735 30		
Privileges	108 00		
Miscellaneous	2 25		
		8,845 55	
Magazine Beach:			
Sale of tickets	$1,156 60		
Privileges	900 00		
		2,056 60	
Blue Hills:			
Sale of tickets		575 90	
			$48,713 90

Metropolitan Parks Expense Fund—Continued

Rentals:					
Buildings			$23,775 00		
Houses			1,403 00		
Ducts			2,904 11		
Land			3,702 00		
Locations			1,246 48		
				$33,030 59	
Sales:					
Land			$71 50		
Wood			874 08		
Old metal, rubber, etc.			391 63		
Old uniforms			185 00		
Old boat			201 00		
Shrubs			4,817 83		
Miscellaneous			352 64		
				6,893 68	
Court fines				30,659 00	
Interest on investments				10,395 31	
Interest on average daily balance				772 68	
Privileges				29,622 10	
Golf privileges				23,261 00	
Sidewalk and entrance construction				8,376 17	
Construction of drains				542 84	
Boat hire				1,195 25	
Wrecking buildings				425 00	
Installing lamp posts				268 54	
Damage to property				2,161 57	
Forfeited deposits				197 00	
Miscellaneous				720 86	
				$197,235 49	
Receipts, prior to Dec. 1, 1929				3,495,100 57	
					$3,692,336 06
Expenditures, Dec. 1, 1929 to Nov. 30, 1930:					
General Expense:					
Advertising			$130 75		
Architect services			30 81		
Discount on securities			2,074 50		
Miscellaneous			52 00		
				$2,288 06	
Police:					
Damages to motorcycles			$41 47		
Gamewell System			6,819 50		
				6,860 97	
Engineering:					
Cable			$313 20		
Freight			10 00		
				323 20	
Blue Hills Reservation:					
Repairs to houses			$928 70		
Refectory:					
Construction:					
Contract, F. G. Jacques Construction Co.	$11,860 19				
Labor and materials	1,274 73				
		$13,134 92			
Architect services		888 15			
Advertising		145 70			
Miscellaneous		110 58			
			14,279 35		
Architect services			310 73		
Appraising			25 00		
Improvements at Hoosicwhisick Pond			2,380 36		
Repairing paths			5,297 47		
Bath house expenses			449 22		
Miscellaneous			108 97		
				23,779 80	
Stony Brook Reservation:					
Repairs to houses				63 56	
Blue Hills Parkway:					
Sidewalk and entrance construction:					
Cost		$779 40			
Refund		52 17			
			$831 57		
Borings			47 63		
Sewer construction			236 83		
Drainage:					
Construction:					
Contract, John P. Condon Corporation	$2,295 85				
Labor and materials	28 83				
		$2,319 68			
Engineering:					
Services	$714 05				
Expenses	65 27				
		779 32			
Advertising		43 65			
			3,142 65		
				4,258 68	

Metropolitan Parks Expense Fund—Continued

Neponset River Parkway:			
Sidewalk and entrance construction:			
Cost		$56 98	
Refund		24 13	
			$81 11
Furnace Brook Parkway:			
Sidewalk and entrance construction:			
Refund			100 00
Old Colony Parkway:			
Sidewalk and entrance construction:			
Cost			151 57
Middlesex Fells Reservation:			
Repairs to houses		$132 34	
Shrubs		5,570 05	
Sidewalk and entrance construction:			
Refund		10 35	
			5,712 74
Middlesex Fells Parkway:			
Damages to lamp pole		$74 05	
Sidewalk and entrance construction:			
Cost	$3,519 38		
Refund	484 67		
		4,004 05	
			4,078 10
Mystic Valley Parkway:			
Damages		$24 13	
Sidewalk and entrance construction:			
Cost	$270 24		
Refund	97 25		
		367 49	
			391 62
Lynn Fells Parkway:			
Sidewalk and entrance construction:			
Cost		$311 65	
Refund		27 30	
			338 95
Middlesex Fells Roads:			
Sidewalk and entrance construction:			
Cost			68 75
Woburn Parkway:			
Sidewalk and entrance construction:			
Refund			41 86
Alewife Brook Parkway:			
Sidewalk and entrance construction:			
Cost		$256 85	
Refund		72 18	
			329 03
Revere Beach Reservation:			
Bath House:			
Payrolls	$30,387 68		
Miscellaneous supplies and expenses	13,372 17		
		$43,759 85	
Sidewalk and entrance construction:			
Cost		229 30	
			43,989 15
Winthrop Shore Reservation:			
Sidewalk and entrance construction:			
Cost		$57 46	
Refund		8 13	
			65 59
Revere Beach Parkway:			
Legal:			
Expenses		$165 50	
Land		25,500 00	
Appraising		1,050 00	
Sidewalk and entrance construction:			
Cost	$221 96		
Refund	272 40		
		494 36	
Damages to lamp pole		124 96	
			27,334 82
Nahant Beach Parkway:			
Sidewalk and entrance construction:			
Cost		$2 00	
Bath House:			
Payrolls	$8,573 22		
Miscellaneous supplies and expenses	8,062 79		
		16,636 01	
			16,638 01
Charles River Upper Division:			
Sidewalk and entrance construction:			
Cost	$303 65		
Refund	20 76		
		$324 41	

Metropolitan Parks Expense Fund—Concluded

Labor and materials used on Soldiers Field Road				$9,707 08	
Filling				999 00	
					$11,030 49
Riverside Recreation Grounds:					
Locker Building:					
Construction:					
Contract, H. Klayman and Son	$20,524 00				
Labor and materials	2,061 60				
		$22,585 60			
Architect services		1,256 44			
Advertising		62 80			
			$23,904 84		
Riverside Public Golf Links			12,430 52		
Riverside Boat House			47 30		
Swimming pool			2,010 96		
					38,393 62
Charles River Lower Basin:					
Erection of band stand			$520 52		
Miscellaneous			1 75		
Magazine Beach Bath House:					
Payrolls		$2,594 44			
Miscellaneous supplies and expenses		479 38			
			3,073 82		
					3,596 09
Cambridge Parkway:					
Labor and materials			$26,116 06		
Stone drain			454 53		
					26,570 59
Nantasket Beach Reservation:					
Bath house:					
Payrolls		$14,225 99			
Miscellaneous supplies and expenses		6,853 46			
			$21,079 45		
New bath house:					
Construction:					
Contracts:					
Milton Construction & Engineering Corporation	$122,716 67				
C. L. Harlow	18,582 31				
	$141,298 98				
Labor and materials	1,751 72				
		$143,050 70			
Engineering		135 05			
Architect services		10,253 49			
Advertising		81 50			
Decorating tablet		120 00			
Miscellaneous		30 20			
			153,670 94		
Repairs to buildings			1,382 17		
Filling			1,490 40		
Architect services			30 45		
Advertising			41 80		
					177,695 21
Neponset River Bridge:					
Repairs					110 00
Saugus River Bridge:					
Repairs					595 55
					$394,887 12
Expenditures, prior to Dec. 1, 1929					3,214,146 15
					$3,609,033 27
Balance, Dec. 1, 1930					$83,302 79

METROPOLITAN PARKS TRUST FUND

Receipts:		
For the year ending Nov. 30, 1930	$118 72	
For the period prior to Dec. 1, 1929	41,223 78	
		$41,342 50
Expenditures:		
For the year ending Nov. 30, 1930	$33 61	
For the period prior to Dec. 1, 1929	38,106 50	
		38,140 11
Balance, Dec. 1, 1930		$3,202 39

EDWIN U. CURTIS MEMORIAL TRUST FUND

Receipts:		
For the year ending Nov. 30, 1930	$44 83	
For the period prior to Dec. 1, 1929	1,546 89	
		$1,591 72
Expenditures:		
For the year ending Nov. 30, 1930	$43 85	
For the period prior to Dec. 1, 1929	—	
		43 85
Balance, Dec. 1, 1930		$1,547 87

JOHN W. WEEKS BRIDGE TRUST FUND

Receipts:		
For the year ending Nov. 30, 1930	$8 70	
For the period prior to Dec. 1, 1929	235,604 42	
		$235,613 12
Expenditures:		
For the year ending Nov. 30, 1930	—	
For the period prior to Dec. 1, 1929	$235,287 90	
		235,287 90
Balance, Dec. 1, 1930		$325 22

GENERAL REVENUE, BUNKER HILL MONUMENT

Receipts:		
For the year ending Nov. 30, 1930	$4,382 20	
For the period prior to Dec. 1, 1929	34,918 30	
		$39,300 50

Maintenance

METROPOLITAN PARKS MAINTENANCE FUND, GENERAL

Appropriation (Chapter 115, Acts of 1930)	$888,600 00
" (Chapter 426, Acts of 1930)	16,450 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books	15,239 28
	$920,289 28

	Expenditures		
Administration and Engineering:			
Police		$256,770 87	
Salaries:			
Commissioners	$2,500 00		
Secretary, clerks, etc.	10,794 83		
Chief engineer and assistants	30,994 40		
		44,289 23	
Rent, care and lighting of building		1,933 30	
Stationery, office supplies and expenses		3,100 36	
Printing		190 70	
Engineering supplies and expenses:			
General	$2,383 42		
Auto expenses	1,769 94		
		4,153 36	
Pensions and annuities		25,972 86	
Retirement payments		6,200 00	
			$342,610 68
Blue Hills Division:			
Labor and teaming:			
General	$83,119 55		
Moth work	34,690 74		
Road repairs	1,722 49		
		$119,532 78	
Street lighting		2,864 84	
Supplies and miscellaneous expenses:			
General	$23,420 90		
Moth work	2,377 91		
Road repairs	1,375 86		
		27,174 67	
			149,572 29
Middlesex Fells Division:			
Labor and teaming:			
General	$65,385 51		
Moth work	32,439 08		
Road repairs	1,217 23		
		$99,041 82	
Supplies and miscellaneous expenses:			
General	$23,739 45		
Moth work	1,739 60		
Road repairs	100 92		
		25,579 97	
			124,621 79
Revere Beach Division:			
Labor and teaming:			
General	$61,089 39		
Moth work	19 25		
Road repairs	652 00		
		$61,760 64	
Street lighting		11,846 76	
Supplies and miscellaneous expenses:			
General	$20,551 68		
Road repairs	1,220 48		
		21,772 16	
			95,379 56
Charles River Upper Division:			
Labor and teaming:			
General	$56,729 27		
Moth work	5,389 97		
Road repairs	850 00		
		$62,969 24	
Street lighting		8,373 82	

Metropolitan Parks Maintenance Fund, General—Concluded

Supplies and miscellaneous expenses:				
General	$25,261 57			
Moth work	134 28			
Road repairs	1,659 34			
		$27,055 19		
Repairs and renewals		465 81		
			$98,864 06	
Charles River Lower Basin:				
Labor and teaming:				
General	$39,309 26			
Moth work	829 00			
Road repairs	1,436 83			
		$41,575 09		
Street lighting		10,560 87		
Supplies and miscellaneous expenses:				
General	$11,279 25			
Moth work	1,252 80			
Road repairs	198 35			
		12,730 40		
			64,866 36	
Engineering Department:				
Bridge repairs:				
Labor:				
Blue Hills Division	$5,516 52			
Middlesex Fells Division	1,602 20			
Revere Beach Division	5,811 67			
Charles River Lower Basin	38 00			
		$12,968 39		
Supplies and miscellaneous expenses:				
Blue Hills Division	$6,350 03			
Middlesex Fells Division	53 33			
Revere Beach Division	3,398 84			
Charles River Upper Division	145 83			
		9,948 03		
			22,916 42	
				$898,831 16
Balance, Dec. 1, 1930				$21,458 12

METROPOLITAN PARKS MAINTENANCE FUND, SPECIALS

Band Concerts

Appropriation (Chapter 115, Acts of 1930)	$20,000 00
" (Chapter 426, Acts of 1930)	5,000 00
	$25,000 00

Expenditures

Advertising		$47 30	
Bands:			
Blue Hills Division	$3,148 50		
Middlesex Fells Division	3,177 50		
Revere Beach Division	4,339 60		
Charles River Upper Division	4,539 15		
Nantasket Beach Division	9,275 00		
Bunker Hill	192 50		
		24,672 25	
			24,719 55
Balance, Dec. 1, 1930			$280 45

Certain Lands, Mystic Lakes

Appropriation (Chapter 398, Acts of 1926. Time extended to May 29, 1930 by Chapter 51, Resolves of 1928)	$25,000 00
Expended to Nov. 30, 1929	100 00
	$24,900 00

Expenditures

Engineering:			
Services	$211 95		
Expenses	54 55		
		$266 50	
Legal:			
Services		205 19	
Appraising		150 00	
Architect services		151 16	
			772 85
Balance, Dec. 1, 1930			$24,127 15

Development of Certain Land in Dedham

Appropriation (Chapter 146, Acts of 1929)	$25,000 00
Expended to Nov. 30 ,1929	16,570 22
	$8,429 78

Metropolitan Parks Maintenance Fund, Specials—Concluded

Expenditures

Construction:			
Labor and materials		$7,560 36	
Engineering:			
Services	$555 04		
Expenses	72 82		
		627 86	
Architect services		128 87	
			$8,317 09
Balance, Dec. 1, 1930			$112 69

BORDER ROADS

Appropriation (Chapter 405, Acts of 1928. Reappropriated by Chapter 425, Acts of 1930)	$10,000 00
No expenditures	
Balance, Dec. 1, 1930	$10,000 00

LYNN SHORE PROTECTION

Appropriation (Chapter 386, Acts of 1929)	$10,000 00
Expended to Nov. 30, 1930	9,590 20
Balance, Dec. 1, 1930	$409 80

BATHING FACILITIES ON CHARLES RIVER

Appropriation (Chapter 426, Acts of 1930)	$10,000 00

Expenditures

Construction:			
Labor and materials		$7,322 94	
Engineering:			
Services	$77 90		
Expenses	6 57		
		84 47	
			7,407 41
Balance, Dec. 1, 1930			$2,592 59

PURCHASE, MOSWETUSSET HUMMOCK

Appropriation (Chapter 426, Acts of 1930)	$9,000 00

Expenditures

Land	$8,946 20	
Legal:		
Services	53 80	
		9,000 00

METROPOLITAN PARKS MAINTENANCE FUND, BOULEVARDS, GENERAL

Appropriation (Chapter 115, Acts of 1930)	$527,300 00
" (Chapter 426, Acts of 1930)	12,500 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books	18,716 44
	$558,516 44

Expenditures

Administration and Engineering:				
Police			$108,042 74	
Salaries:				
Commissioners	$2,500 00			
Secretary, clerks, etc.	10,794 81			
Chief engineer and assistants	26,526 97			
			39,821 78	
Rent, care and lighting of building			1,933 33	
Stationery, office supplies and expenses			3,159 78	
Printing			190 70	
Engineering supplies and expenses:				
General	$3,131 04			
Auto expenses	1,698 97			
			4,830 01	
Retirement payments			945 23	
				$158,923 57
Blue Hills Division:				
Labor and teaming:				
General	$39,855 07			
Moth work	1,150 84			
Road repairs	996 83			
			$42,002 74	
Street lighting			17,317 29	
Supplies and miscellaneous expenses:				
General	$16,259 20			
Moth work	193 95			
Road repairs	2,120 65			
			$18,573 80	
Repairs and renewals			13 62	
				77,907 45

Metropolitan Parks Maintenance Fund, Boulevards, General—Concluded

Middlesex Fells Division:				
Labor and teaming:				
General	$65,313 31			
Moth work	3,177 81			
Road repairs	9,462 20			
		$77,953 32		
Street lighting		27,878 63		
Supplies and miscellaneous expenses:				
General	$23,889 80			
Moth work	22 25			
Road repairs	5,640 59			
		29,552 64		
			$135,384 59	
Revere Beach Division:				
Labor and teaming:				
General	$51,707 01			
Moth work	19 25			
Road repairs	1,236 11			
		$52,962 37		
Street lighting		16,131 98		
Supplies and miscellaneous expenses:				
General	$8,615 70			
Road repairs	4,700 81			
		13,316 51		
Repairs and renewals		23 03		
			82,433 89	
Charles River Upper Division:				
Labor and teaming:				
General	$5,851 93			
Moth work	2,640 00			
		$8,491 93		
Supplies and miscellaneous expenses:				
General		152 73		
			8,644 66	
Charles River Lower Basin:				
Labor and teaming:				
General	$10,719 35			
Moth work	638 99			
Road repairs	294 47			
		$11,652 81		
Street lighting		2,198 79		
Supplies and miscellaneous expenses:				
General	$1,437 68			
Road repairs	556 64			
		1,994 32		
Repairs and renewals		24 21		
			15,870 13	
Engineering Department:				
Bridge repairs:				
Labor:				
Blue Hills Division	$1,205 28			
Middlesex Fells Division	410 81			
Revere Beach Division	8,739 90			
Charles River Lower Basin	19,464 70			
		$29,820 69		
Supplies and miscellaneous expenses:				
Blue Hills Division	$182 16			
Middlesex Fells Division	8 11			
Revere Beach Division	3,299 82			
Charles River Lower Basin	5,765 33			
		9,255 42		
			39,076 11	
Reimbursement, City of Boston			12,500 00	
				$530,740 40
Balance, Dec. 1, 1930				$27,776 04

METROPOLITAN PARKS MAINTENANCE FUND, BOULEVARDS, SPECIALS

Electric Lighting System

Balance of Chapters 146 and 386, Acts of 1929				$20,625 11
Expenditures				
Installation of conduits, etc.				
Contract, Coleman Bros.		$369 82		
Labor and materials		12,522 51		
			$12,892 33	
Engineering:				
Services		$233 00		
Expenses		40 24		
			273 24	
Freight			188 60	
				13,354 17
Balance, Dec. 1, 1930				$7,270 94

Metropolitan Parks Maintenance Fund, Boulevards, Specials—Continued

OLD COLONY BOULEVARD

Appropriation (Chapter 398, Acts of 1926)		$250,000 00
" (Chapter 138, Acts of 1927)		500,000 00
" (Chapter 127, Acts of 1928)		200,000 00
		$950,000 00
Expended to Nov. 30, 1929		931,778 27
		$18,221 73

Expenditures

Construction:				
Contract, Cronin and Driscoll				
Claim, Old Colony Crushed Stone Co.			$15,275 72	
Labor and materials			690 59	
				15,966 31
Balance, Dec. 1, 1930				$2,255 42

RESURFACING BOULEVARDS AND PARKWAYS

Appropriation (Chapter 115, Acts of 1930)		$200,000 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books		23,643 45
		$223,643 45

Expenditures

General Expense:				
Engineering:				
Services	$13,088 26			
Expenses	1,032 23			
		$14,120 49		
Legal:				
Services		63 50		
			$14,183 99	
Blue Hills Division:				
Construction:				
Contracts:				
University Excavating Co.	$5,968 47			
University Excavating Co.	6,904 47			
Raimo and Panakio	10,255 53			
A. G. Tomasello and Son	5,330 31			
	$28,458 78			
Labor and materials	5,303 35			
		$33,762 13		
Advertising		113 70		
			33,875 83	
Middlesex Fells Division:				
Construction:				
Contracts:				
M. McDonough Co.	$23,830 93			
M. McDonough Co.	6,446 25			
	$30,277 18			
Labor and materials	196 02			
		$30,473 20		
Advertising		108 80		
			30,582 00	
Revere Beach Division:				
Construction:				
Contract, Simpson Bros. Corp.		$3,165 51		
Labor and materials		583 75		
			3,749 26	
Charles River Upper Division:				
Construction:				
Labor and materials			1,913 87	

Expenditures

Charles River Lower Basin:				
Construction:				
Contracts:				
John McCourt Co.	$42,462 30			
John McCourt Co.	35,122 60			
John McCourt Co.	23,766 94			
	$101,351 84			
Labor and materials	4,001 29			
		$105,353 13		
Advertising		208 75		
			105,561 88	
				189,866 83
Balance, Dec. 1, 1930				$33,776 62

EXTENSION OF QUINCY SHORE RESERVATION

Appropriation (Chapter 343, Acts of 1927)		$35,000 00
Expended to Nov. 30, 1929		1,188 20
		$33,811 80

Metropolitan Parks Maintenance Fund, Boulevards, Specials—Continued
Extension of Quincy Shore Reservation—Concluded

Expenditures

Construction:			
Contract, C. M. Callahan, Inc.		$18,504 50	
Labor and materials		11 92	
			$18,516 42
Engineering:			
Expenses			135 67
			$18,652 09
Balance, Dec. 1, 1930			$15,159 71

CIRCUMFERENTIAL HIGHWAY

Appropriation (Chapter 398, Acts of 1926)	$115,000 00
" (Chapter 386, Acts of 1929)	159,000 00
" (Chapter 115, Acts of 1930)	371,000 00
	$645,000 00
Expended to Nov. 30, 1929	157,357 16
	$487,642 84

Expenditures

Lynn Fells Parkway:			
Construction:			
Contract, M. McDonough Co.	$189,695 51		
Labor and materials	7,562 55		
		$197,258 06	
Engineering:			
Services	$13,023 30		
Expenses	1,873 00		
		14,896 30	
Land		419 00	
Legal:			
Services	$131 39		
Expenses	19 35		
		150 74	
			$212,724 10
East Milton Street:			
Construction:			
Contract, Thomas J. McCue	$31,609 91		
Labor and materials	730 05		
		$32,339 96	
Engineering:			
Services	$3,041 58		
Expenses	114 36		
		3,155 94	
Land		2,548 75	
Legal:			
Services	$739 88		
Expenses	72 39		
		812 27	
Rent		50 00	
Appraising		150 00	
Advertising		78 15	
			39,135 07
Jerry Jingle Road:			
Engineering:			
Services		$2,402 97	
Expenses		114 64	
			2,517 61
			254,376 78
Balance, Dec. 1, 1930			$233,266 06

LAND FOR BOULEVARD ALONG CHARLES RIVER

Appropriation (Chapter 343, Acts of 1927)	$80,000 00
" (Chapter 127, Acts of 1928)	100,000 00
" (Chapter 146, Acts of 1929)	200,000 00
	$380,000 00
Expended to Nov. 30, 1929	262,931 72
	$117,068 28

Expenditures

Construction:			
Contract, C. & R. Construction Co.		$58,322 13	
Labor and materials		2,563 52	
			$60,885 65
Engineering:			
Services		$3,612 04	
Expenses		71 94	
			3,683 98
Legal:			
Services		$109 77	
Expenses		1 00	
			110 77
Trees			1,105 44
Appraising			100 00
			65,885 84
Balance, Dec. 1, 1930			$51,182 44

Metropolitan Parks Maintenance Fund, Boulevards, Specials—Concluded

LAND AND FILLING, BROOKLINE-NEWTON BOULEVARD

Appropriation (Chapter 358, Acts of 1929)		$50,000 00
" (Chapter 386, Acts of 1929)		25,000 00
		$75,000 00
Expended to Nov. 30, 1929		1,556 61
		$73,443 39

Expenditures

Construction:			
Contract, C. & R. Construction Co.	$37,799 54		
Labor and materials	2,017 76		
		$39,817 30	
Engineering:			
Services	$3,917 48		
Expenses	324 97		
		4,242 45	
Land		3,235 00	
Legal:			
Services	$262 90		
Expenses	31 36		
		294 26	
Appraising		697 00	
			48,286 01
Balance, Dec. 1, 1930			$25,157 38

RECONSTRUCTION FELLSWAY, FOREST AND MAIN STREETS

Appropriation (Chapter 426, Acts of 1930)	$260,000 00

Expenditures

Construction:			
Contract, C. & R. Construction Co.	$94,059 14		
Labor and materials	2,868 57		
		$96,927 71	
Engineering:			
Services	$10,534 19		
Expenses	491 36		
		11,025 55	
Legal:			
Services	$24 56		
Expenses	7 45		
		32 01	
Advertising		56 55	
			108,041 82
Balance, Dec. 1, 1930			$151,958 18

TRAFFIC CIRCLE AT REVERE BEACH AND MIDDLESEX FELLS PARKWAYS

Appropriation (Chapter 426, Acts of 1930)	$40,000 00

Expenditures

Construction:			
Contract, M. McDonough Co.	$15,910 98		
Labor and materials	652 02		
		$16,563 00	
Engineering:			
Services	$3,048 61		
Expenses	10 08		
		3,058 69	
Advertising		64 05	
			19,685 74
Balance, Dec. 1, 1930			$20,314 26

LAND, MEMORIAL DRIVE AND BOYLSTON STREET

Appropriation (Chapter 426, Acts of 1930)	$20,000 00
No expenditures	
Balance, Dec. 1, 1930	$20,000 00

LAND FOR EXTENSION, FURNACE BROOK PARKWAY

Appropriation (Chapter 426, Acts of 1930)	$90,000 00
No expenditures	
Balance, Dec. 1, 1930	$90,000 00

LAND, BOULEVARD, NEWBURYPORT TURNPIKE TO LYNN WOODS PARKWAY

Appropriation (Chapter 426, Acts of 1930)	$10,000 00
No expenditures	
Balance, Dec. 1, 1930	$10,000 00

CHARLES RIVER BASIN MAINTENANCE

Appropriation (Chapter 115, Acts of 1930)			$219,800 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books			7,073 78
			$226,873 78
Expenditures			
Park and Water Areas:			
Police	$79,858 45		
Labor and teaming:			
General	$46,137 64		
Moth work	321 75		
Road repairs	327 75		
	46,787 14		
Street lighting	4,315 82		
Supplies and miscellaneous expenses:			
General	$9,309 21		
Road repairs	174 75		
	9,483 96		
Motor boat	3,950 00		
		$144,395 37	
Locks, Gates and Drawbridges:			
Labor:			
General	$55,783 71		
Bridge repairs	2,921 73		
	$58,705 44		
Supplies and miscellaneous expenses:			
General	8,525 09		
		67,230 53	
Retirement payments		1,254 42	
			212,880 32
Balance, Dec. 1, 1930			$13,993 46

NANTASKET BEACH MAINTENANCE

Appropriation (Chapter 115, Acts of 1930)			$86,450 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books			1,031 75
			$87,481 75
Expenditures			
Police		$32,991 11	
Labor and teaming:			
General		35,346 85	
Street lighting		1,609 31	
Supplies and miscellaneous expenses:			
General	$14,489 22		
Road repairs	439 54		
		14,928 76	
			84,876 03
Balance, Dec. 1, 1930			$2,605 72

WELLINGTON BRIDGE MAINTENANCE

Appropriation (Chapter 115, Acts of 1930)			$22,000 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books			73 56
			$22,073 56
Expenditures			
Labor:			
General	$8,984 37		
Bridge repairs	7,873 35		
		$16,857 72	
Supplies and miscellaneous expenses:			
General	$554 61		
Bridge repairs	3,991 13		
		4,545 74	
Retirement payments		201 03	
			21,604 49
Balance, Dec. 1, 1930			$469 07

BUNKER HILL MAINTENANCE

Appropriation (Chapter 115, Acts of 1930)			$13,000 00
Expenditures			
Police		$4,450 98	
General labor		6,437 32	
Flood lighting		270 08	
Supplies and miscellaneous expenses		1,473 69	
			12,632 07
Balance, Dec. 1, 1930			$367 93

BUNKER HILL MAINTENANCE, SPECIALS

Improvements to Bunker Hill Grounds

Appropriation (Chapter 146, Acts of 1929)				$10,000 00
Expended to Nov. 30, 1929				5,812 78
				$4,187 22
Expenditures				
Construction:				
Contracts:				
University Excavating Co.	$1,076 05			
Banspar Construction Co.	1,794 00			
		$2,870 05		
Labor and materials		150 16		
			$3,020 21	
Engineering:				
Services		$559 55		
Expenses		22 94		
			592 49	
Architect services			230 28	
Advertising			18 00	
				3,850 98
Balance, Dec. 1, 1930				$336 24

Steps and Walks

Appropriation (Chapter 115, Acts of 1930)				$10,000 00
Expenditures				
Construction:				
Contract, Banspar Construction Co.			$9,505 53	
Engineering:				
Services			220 20	
Architect services			47 14	
Advertising			26 45	
				9,799 32
Balance, Dec. 1, 1930				$200 68

Analysis of 1930 Receipts

Credited to:			
Metropolitan Parks Const. Fund, Series I, Interest Fund		$177 38	
Metropolitan Parks Const. Fund, Series II, Interest Fund		177 38	
Metropolitan Parks Expense Fund		197,235 49	
General Revenue		4,382 20	
			$201,972 45

BONDS, SINKING FUND AND NET DEBT

Metropolitan District Commission Headquarters Building				
Serial Notes issued:				
Year ending Nov. 30, 1930			$750,000 00	
Serial Notes paid:				
Year ending Nov. 30, 1930			150,000 00	
Serial Notes outstanding Nov. 30, 1930				$600,000 00
Parks Division				
Metropolitan Parks Construction, Series I				
Bonds issued:				
Sinking Fund Bonds:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$9,485,000 00			
		$9,485,000 00		
Serial Bonds and Notes:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$1,117,043 96			
		1,117,043 96		
			$10,602,043 96	
Sinking Fund Bonds paid:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$125,000 00			
		$125,000 00		
Serial Bonds and Notes paid:				
Year ending Nov. 30, 1930	$257,250 00			
Period prior to Dec. 1, 1929	305,293 96			
		562,543 96		
			687,543 96	
Bonds outstanding Dec. 1, 1930				$9,914,500 00
Sinking Fund:				
Total, Dec. 1, 1930			$6,721,455 67	
Total, Dec. 1, 1929			6,396,353 84	
Increase during 1930				$325,101 83
Net Debt:				
Total, Dec. 1, 1930			$3,193,044 33	
Total, Dec. 1, 1929			3,775,396 16	
Decrease during 1930				$582,351 83

Bonds, Sinking Fund and Net Debt—Concluded

Metropolitan Parks Construction, Series II				
Bonds issued:				
Sinking Fund Bonds:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$2,567,500 00			
		$2,567,500 00		
Serial Bonds and Notes:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$2,383,056 62			
		2,383,056 62		
			$4,950,556 62	
Serial Bonds and Notes paid:				
Year ending Nov. 30, 1930		$100,937 50		
Period prior to Dec. 1, 1929		901,056 62		
			1,001,994 12	
Bonds outstanding Dec. 1, 1930				$3,948,562 50
Sinking Fund:				
Total, Dec. 1, 1930			$1,743,530 53	
Total, Dec. 1, 1929			1,659,934 34	
Increase during 1930				$83,596 19
Net Debt:				
Total, Dec. 1, 1930			$2,205,031 97	
Total, Dec. 1, 1929			2,389,565 66	
Decrease, during 1930				$184,533 69
Charles River Basin Construction:				
Bonds issued:				
Sinking Fund Bonds:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$4,125,000 00			
		$4,125,000 00		
Serial Bonds:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929	$375,000 00			
		375,000 00		
			$4,500,000 00	
Serial Bonds paid:				
Year ending Nov. 30, 1930		$10,000 00		
Period prior to Dec. 1, 1929		172,000 00		
			182,000 00	
Bonds outstanding Dec. 1, 1930				$4,318,000 00
Sinking Fund:				
Total, Dec. 1, 1930			$2,161,777 25	
Total, Dec. 1, 1929			2,068,573 07	
Increase during 1930				$93,204 18
Net Debt:				
Total, Dec. 1, 1930			$2,156,222 75	
Total, Dec. 1, 1929			2,259,426 93	
Decrease during 1930				$103,204 18
Charles River Bridges Construction:				
Notes issued:*				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929			$4,400,000 00	
				$4,400,000 00
Notes paid:				
Year ending Nov. 30, 1930				
Period prior to Dec. 1, 1929			$4,400,000 00	
				$4,400,000 00

* Including renewals.

SEWERAGE DIVISION

Construction

METROPOLITAN SEWERAGE CONSTRUCTION FUND, NORTH SYSTEM

Total amount authorized to Dec. 1, 1929			$8,611,521 55
Receipts:			
For the year ending Nov. 30, 1930			
For the period prior to Dec. 1, 1929		$87,514 78	
			87,514 78
			$8,699,036 33

Metropolitan Sewerage Construction Fund, North System—Concluded

		Expenditures		
New Mystic Valley Main Sewer:				
Section 109:				
Construction:				
Contract, V. James Grande		$7,445 90		
Land damages		914 88		
			$8,360 78	
Section 110:				
Construction:				
Contract, J. H. Ferguson and Co.			10,537 59	
			$18,898 37	
Amounts charged to Nov. 30, 1929			8,602,442 46	
				8,621,340 83
Balance, Dec. 1, 1930				$77,695 50

METROPOLITAN SEWERAGE CONSTRUCTION FUND, SOUTH SYSTEM

Total amount authorized to Dec. 1, 1929				$12,520,151 75
Appropriation (Chapter 398, Acts of 1930)				600,000 00
				$13,120,151 75
Receipts:				
For the year ending Nov. 30, 1930				
For the period prior to Dec. 1, 1929			$24,599 61	
				24,599 61
				$13,144,751 36

		Expenditures		
New Neponset Valley Sewer:				
Section 107:				
Construction:				
Contracts:				
Edward P. Healey	$779 24			
V. Barletta Co.	82,387 97			
		$83,167 21		
Labor and materials		752 64		
		$83,919 85		
Engineering:				
Services	$3,144 36			
Expenses	176 51			
		3,320 87		
			$87,240 72	
Section 108:				
Construction:				
Contract:				
Frank W. Christy	$93,598 85			
Labor and materials	1,312 34			
		$94,911 19		
Engineering:				
Services	$4,197 00			
Expenses	360 55			
		4,557 55		
Legal:				
Services	$30 53			
Expenses	3 19			
		33 72		
Appraising		550 00		
Easements		1,300 00		
			101,352 46	
Section 109:				
Construction:				
Contract:				
V. Barletta Co.	$57,744 75			
Labor and materials	600 05			
		$58,344 80		
Engineering:				
Services	$5,062 74			
Expenses	263 80			
		5,326 54		
Legal:				
Services	$221 35			
Expenses	13 04			
		234 39		
Appraising		700 00		
			64,605 73	
Section 110:				
Construction:				
Contract:				
J. H. Ferguson & Co.	$28,258 08			
Labor and materials	149 11			
		$28,407 19		

Metropolitan Sewerage Construction Fund, South System—Continued

Engineering:			
Services. . . .	$5,226 83		
Expenses . . .	539 58		
		$5,766 41	
Legal:			
Services. . . .	$128 53		
Expenses . . .	22 72		
		151 25	
Appraising		75 00	
			$34,399 85
Section 111:			
Construction:			
Contracts:			
Edward P. Healey .	$567 67		
Frank W. Christy .	59,330 00		
		$59,897 67	
Labor and materials . . .		818 01	
		$60,715 68	
Engineering:			
Services. . . .	$4,593 77		
Expenses . . .	629 02		
		5,222 79	
Advertising		37 10	
			65,975 57
Section 112:			
Construction:			
Contracts:			
Edward P. Healey .	$567 67		
C. & R. Construction Co.	57,486 76		
		$58,054 43	
Labor and materials . . .		1,113 81	
		$59,168 24	
Engineering:			
Services. . . .	$4,012 66		
Expenses . . .	771 03		
		4,783 69	
Advertising		37 10	
			63,989 03
Section 113:			
Construction:			
Contracts:			
Edward P. Healey .	$311 48		
A. Baruffaldi . .	41,718 00		
		$42,029 48	
Labor and materials . . .		1,277 30	
		$43,306 78	
Engineering:			
Services. . . .	$5,662 69		
Expenses . . .	952 32		
		6,615 01	
Legal:			
Services. . . .	$211 34		
Expenses . . .	15 74		
		227 08	
Appraising		100 00	
Advertising		42 80	
			50,291 67
Section 114:			
Construction:			
Contract:			
Edward P. Healey .	$873 91		
Labor and materials .	155 60		
		$1,029 51	
Engineering:			
Services. . . .	$5,351 50		
Expenses . . .	1,202 85		
		6,554 35	
Legal:			
Services. . . .	$32 33		
Expenses . . .	12 21		
		44 54	
Advertising		38 60	
			7,667 00

Metropolitan Sewerage Construction Fund, South System—Continued

Section 115:			
Construction:			
Contract:			
Edward P. Healey	$562 41		
Labor and materials	360 86		
		$923 27	
Engineering:			
Services	$5,893 25		
Expenses	1,402 94		
		7,296 19	
Legal:			
Services	$32 33		
Expenses	12 21		
		44 54	
Advertising		38 60	
			$8,302 60
Section 116:			
Construction:			
Contract:			
Edward P. Healey	$1,142 26		
Labor and materials	1,313 00		
		$2,455 26	
Engineering:			
Services	$3,441 73		
Expenses	419 13		
		3,860 86	
			6,316 12
Section 117:			
Construction:			
Labor and materials		$1,014 64	
Engineering:			
Services	$1,495 32		
Expenses	407 29		
		1,902 61	
			2,917 25
Section 118:			
Construction:			
Contract:			
Edward P. Healey	$139 51		
Labor and materials	421 21		
		$560 72	
Engineering:			
Services	$1,720 00		
Expenses	292 09		
		2,012 09	
			2,572 81
Section 119:			
Construction:			
Contract:			
Edward P. Healey	$609 99		
Labor and materials	415 07		
		$1,025 06	
Engineering:			
Services	$1,310 00		
Expenses	149 49		
		1,459 49	
			2,484 55
Section 120:			
Construction:			
Contract:			
Edward P. Healey		$609 99	
Engineering:			
Services	$755 00		
Expenses	39 33		
		794 33	
			1,404 32
Section 121:			
Engineering:			
Services			395 00
Part of Section 109:			
Engineering:			
Expenses		$22 25	
Advertising		45 35	
			67 60
Part of Section 110:			
Engineering:			
Services	$150 00		
Expenses	18 81		
		$168 81	
Advertising		42 75	
			211 56
			$500,193 84

Metropolitan Sewerage Construction Fund, South System—Concluded

Sewers in Braintree, Weymouth and Quincy:				
Section 122:				
Construction:				
Contract:				
Edward P. Healey		$486 16		
Engineering:				
Services	$1,531 61			
Expenses	591 41			
		2,123 02		
			$2,609 18	
Section 123:				
Construction:				
Contract:				
Edward P. Healey		$639 64		
Engineering:				
Services	$350 00			
Expenses	436 50			
		786 50		
			1,426 14	
Section 124:				
Construction:				
Contract:				
Edward P. Healey		$928 15		
Engineering:				
Services	$442 58			
Expenses	10 87			
		453 45		
			1,381 60	
Section 125:				
Construction:				
Contract:				
Edward P. Healey		$441 99		
Engineering:				
Expenses		37 24		
			479 23	
				$5,896 15
				$506,089 99
Amounts charged to Nov. 30, 1929				10,084,141 93
				$10,590,231 92
Balance, Dec. 1, 1930				$2,554,519 44

Miscellaneous

DRAINAGE IN EVERETT, MALDEN AND REVERE

Authorization (Chapter 456, Acts of 1924)				$70,000 00
	Expenditures			
Construction:				
Contract, M. McDonough Co.		$20,810 76		
Labor and materials		750 87		
			$21,561 63	
Engineering:				
Services		$2,399 09		
Expenses		180 77		
			2,579 86	
Land damages			1,750 00	
Legal:				
Services		$142 46		
Expenses		32 16		
			174 62	
Appraising			400 00	
Advertising			28 80	
				$26,494 91
Amounts charged to Nov. 30, 1929				2,914 74
				29,409 65
Balance, Dec. 1, 1930				$40,590 35

Maintenance

METROPOLITAN SEWERAGE MAINTENANCE FUND, NORTH SYSTEM—GENERAL

Appropriation (Chapter 115, Acts of 1930)	$351,700 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books	24,696 26
	$376,396 26

Metropolitan Sewerage Maintenance Fund, North System—General—Concluded

Expenditures

Administration and Engineering:				
Salaries:				
Commissioners	$1,250 00			
Secretary and clerks	5,397 41			
Chief engineer and assistants	11,890 00			
		$18,537 41		
Rent, care and lighting of building		1,366 95		
Printing		97 88		
Stationery, office supplies and expenses		877 05		
Engineering supplies and expenses		91 96		
			$20,971 25	
Industrial accident compensation			644 43	
Retirement payments			3,748 65	
				$25,364 33
Deer Island Pumping Station:				
Labor			$37,834 05	
Fuel			23,293 33	
Oil, waste and packing			842 47	
Water			1,927 20	
Repairs and renewals			852 65	
General supplies			1,035 25	
Miscellaneous expenses			1,235 82	
				67,020 77
East Boston Pumping Station:				
Labor			$37,385 31	
Fuel			16,478 17	
Oil, waste and packing			1,356 51	
Water			2,140 50	
Repairs and renewals			7,720 07	
General supplies			2,058 81	
Miscellaneous expenses			344 43	
				67,483 80
Charlestown Pumping Station:				
Labor			$28,270 33	
Fuel			6,070 34	
Oil, waste and packing			648 00	
Water			694 80	
Repairs and renewals			869 09	
General supplies			451 62	
Miscellaneous expenses			410 88	
				37,415 06
Alewife Brook Pumping Station:				
Labor			$14,771 31	
Fuel			3,078 11	
Oil, waste and packing			268 02	
Water			804 60	
Repairs and renewals			87 90	
General supplies			229 23	
Miscellaneous expenses			170 66	
				19,409 83
Reading Pumping Station:				
Labor			$7,305 85	
Fuel			92 12	
Repairs and renewals			10 58	
General supplies			2,310 55	
Miscellaneous expenses			111 25	
				9,830 35
Sewer Lines, Buildings and Grounds:				
Engineering assistants			$4,860 00	
Labor			79,186 38	
Deer Island Ferry			1,400 00	
Automobiles			611 05	
Brick, cement and lime			388 96	
Castings, ironwork and metal			784 42	
Lumber, paint and oils			3,204 14	
Machinery, tools and appliances			293 29	
Rubber and oiled goods			233 14	
Sand, gravel and stone			49 53	
Repairs			4,304 20	
General supplies			2,659 46	
Miscellaneous expenses			4,017 98	
				101,992 55
Stables:				
Labor			$2,600 00	
Subsistence			366 60	
Vehicles, harnesses and fittings			25	
Miscellaneous expenses			342 37	
				3,309 22
				$331,825 91
Balance, Dec. 1, 1930				$44,570 35

METROPOLITAN SEWERAGE MAINTENANCE FUND, SOUTH SYSTEM—GENERAL

Appropriation (Chapter 115, Acts of 1930)		$226.700 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books		9,669 24
		$236,369 24

Expenditures

Administration and Engineering:			
Salaries:			
Commissioners	$1,250 00		
Secretary and clerks	5,397 40		
Chief engineer and assistants	8,680 00		
	$15,327 40		
Rent, care and lighting of building	1,366 90		
Printing	97 87		
Stationery, office supplies and expenses	763 07		
Engineering supplies and expenses	72 10		
		$17,627 34	
Industrial accident compensation		219 28	
Retirement payments		2,757 41	
			$20,604 03
Ward Street Pumping Station:			
Labor		$46,789 94	
Fuel		13,643 63	
Oil, waste and packing		941 25	
Water		4,128 70	
Repairs and renewals		9,326 83	
General supplies		1,767 55	
Miscellaneous expenses		154 25	
			76,752 15
Quincy Pumping Station:			
Labor		$15,352 51	
Fuel		3,284 59	
Oil, waste and packing		439 71	
Water		435 33	
Repairs and renewals		315 92	
General supplies		407 03	
Miscellaneous expenses		65 28	
			20,300 37
Nut Island Screen House:			
Labor		$15,254 83	
Fuel		2,301 37	
Oil, waste and packing		184 52	
Water		576 97	
Repairs and renewals		76 62	
General supplies		631 41	
Miscellaneous expenses		67 98	
			19,093 70
Sewer Lines, Buildings and Grounds:			
Engineering assistants		$5,955 00	
Labor		44,331 37	
Automobiles		439 34	
Brick, cement and lime		140 56	
Castings, ironwork and metal		602 57	
Lumber, paint and oils		547 86	
Machinery, tools and appliances		156 83	
Repairs, ordinary		151 90	
Repairs and renewals		350 39	
Rubber and oiled goods		42 82	
Sand, gravel and stone		176 18	
General supplies		1,230 81	
Miscellaneous expenses		771 79	
Pumping by City of Boston		11,998 37	
			66,895 79
Stables:			
Labor		$780 00	
Subsistence		258 58	
Vehicles, harnesses and fittings		20 70	
Miscellaneous expenses		102 25	
			1,161 53
			204,807 57
Balance, Dec. 1, 1930			$31,561 67

Analysis of 1930 Receipts

Credited to:		
Metropolitan Sewerage Sinking Fund, North System	$175 00	
Metropolitan Sewerage Maintenance Fund, North System	47 32	
Metropolitan Sewerage Maintenance Fund, South System	86 90	
Metropolitan Sewerage Interest Fund, North System	88 70	
Metropolitan Sewerage Interest Fund, South System	150 70	
		$548 62

BONDS, SINKING FUNDS AND NET DEBT

Metropolitan Sewerage Construction, North System:			
Bonds issued:			
Sinking Fund Bonds:			
Year ending Nov. 30, 1930	———		
Period prior to Dec. 1, 1929	$6,563,000 00		
		$6,563,000 00	
Serial Bonds:			
Year ending Nov. 30, 1930	———		
Period prior to Dec. 1, 1929	$1,725,500 00		
		1,725,500 00	
			$8,288,500 00
Sinking Fund Bonds paid:			
Year ending Nov. 30, 1930	$5,795,000 00		
Period prior to Dec. 1, 1929	———		
		$5,795,000 00	
Serial Bonds paid:			
Year ending Nov. 30, 1930	$94,500 00		
Period prior to Dec. 1, 1929	738,000 00		
		832,500 00	
			6,627,500 00
Bonds outstanding Dec. 1, 1930			$1,661,000 00
Sinking Fund:			
Total, Dec. 1, 1930			$258,610 33
Total, Dec. 1, 1929			6,026,454 75
Decrease during 1930			$5,767,844 42
Net Debt:			
Total, Dec. 1, 1930			$1,402,389 67
Total, Dec. 1, 1929			1,524,045 25
Decrease during 1930			$121,655 58
Metropolitan Sewerage Construction, South System:			
Bonds issued:			
Sinking Fund:			
Year ending Nov. 30, 1930	———		
Period prior to Dec. 1, 1929	$8,877,912 00		
		$8,877,912 00	
Serial Bonds:			
Year ending Nov. 30, 1930	$500,000 00		
Period prior to Dec. 1, 1929	1,125,000 00		
		1,625,000 00	
			$10,502,912 00
Sinking Fund Bonds paid:			
Year ending Nov. 30, 1930	$800,000 00		
Period prior to Dec. 1, 1929	———		
		$800,000 00	
Serial Bonds paid:			
Year ending Nov. 30, 1930	$56,000 00		
Period prior to Dec. 1, 1929	369,000 00		
		425,000 00	
			1,225,000 00
Bonds outstanding Dec. 1, 1930			$9,277,912 00
Sinking Fund:			
Total, Dec. 1, 1930.			$4,080,611 14
Total, Dec. 1, 1929.			4,465,943 65
Decrease during 1930			$385,335 12
Net Debt:			
Total, Dec. 1, 1930.			$5,197,300 86
Total, Dec. 1, 1929.			5,167,968 35
Increase during 1930			$29,332 51

WATER DIVISION

Construction

METROPOLITAN WATER CONSTRUCTION FUND

Total amount authorized to Dec. 1, 1929.			$47,480,000 00
Authorization (Chapter 115, Acts of 1930, Item 769)			15,000 00
" (Chapter 115, Acts of 1930, Item 770)			400,000 00
			$47,895,000 00
Receipts:			
For the year ending Nov. 30, 1930		$13,912 10	
For the period prior to Dec. 1, 1929		321,817 42	
			335,729 52
			$48,230,729 52

Metropolitan Water Construction Fund—Continued

Expenditures

General:				
Chlorination:				
Labor		$715 76		
Supplies and expenses		1,102 05		
			$1,817 81	
Southern High Service, Section 52:				
Easement			7,500 00	
			$9,317 81	
Less stock transferred to other accounts			2,872 99	
				$6,444 82
Certain Improvements:				
Southern High Service, Section 52:				
Easement		$13,701 35		
Legal:				
Services		70 59		
			$13,771 94	
Meters and Connections:				
Contract:				
Walsh Holyoke Steam Boiler Works Inc.		$3,056 68		
Labor and materials		11,879 76		
			14,936 44	
			$28,708 38	
Less stock transferred to other accounts			9,836 79	
				18,871 59
Property for Protection of Water Supply:				
Land			$4,560 60	
Legal:				
Services		$492 34		
Expenses		75 89		
			568 23	
				5,128 83
Additional Weston Aqueduct Supply Main:				
Section 13:				
Engineering:				
Services		$2,313 71		
Expenses		8 80		
			$2,322 51	
Section 14:				
Engineering:				
Services			1,131 74	
Section 15:				
Construction:				
Contracts:				
C. & R. Construction Co.	$90,106 02			
John McCourt Co.	30,311 45			
A. G. Tomasello and Son, Inc.	18,552 61			
		$138,970 08		
Labor and materials		23,588 51		
		$162,558 59		
Engineering:				
Services	$20,049 45			
Expenses	1,672 61			
		21,722 06		
			184,280 65	
Section 16:				
Engineering:				
Services		$310 00		
Expenses		12 00		
			322 00	
Northern High Service Pipe Lines, Section 54:				
Construction:				
Contracts:				
John Williams	$8,637 88			
Labor and materials	36,228 59			
		$44,866 47		
Engineering:				
Services	$1,380 54			
Expenses	70 03			
		1,450 57		
			46,317 04	
Northern High Service Pipe Lines, Section 55:				
Construction:				
Contract:				
Cenedella and Co.	$7,614 27			
Labor and materials	22,815 99			
		$30,430 26		

Metropolitan Water Construction Fund—Concluded

Engineering:				
Services	$2,528 54			
Expenses	88 08			
		$2,616 62		
Legal:				
Services	$39 94			
Expenses	13 02			
		52 96		
			$33,099 84	
Stock:				
Contracts:				
Michigan Valve and Foundry Co.		$3,415 80		
Warren Foundry and Pipe Co.		64,142 36		
Other stock		2,546 41		
			$70,104 57	
			$337,578 35	
Less stock transferred to other accounts			74,743 61	
				$262,834 74
				$293,279 98
Amounts charged to Nov. 30, 1929				47,509,219 66
				$47,802,499 64
Balance, Dec. 1, 1930				$428,229 88

METROPOLITAN WATER MAINTENANCE FUND—GENERAL

Appropriation (Chapter 115, Acts of 1930)	$902,400 00
Balance brought forward from 1929 appropriation to cover 1929 expenditures on 1930 books	62,032 86
	$964,432 86

Expenditures

Administration and engineering:				
Salaries:				
Commissioners	$2,500 00			
Secretary and clerks	10,794 80			
Chief engineer and assistants	27,190 47			
		$40,485 27		
Rent, care and lighting of building		2,733 85		
Printing		195 76		
Stationery, office supplies and expenses		1,654 45		
Engineering supplies and expenses		3,725 73		
			$48,795 06	
Payments in lieu of taxes			56,655 11	
Industrial accident compensation			2,256 70	
Retirement payments			9,954 88	
				$117,661 75
Wachusett Department:				
Superintendence			$14,445 35	
Labor			109,111 72	
Supplies and expenses			28,329 91	
				151,886 98
Sudbury Department:				
Superintendence			$16,827 52	
Labor			135,875 58	
Supplies and expenses			23,430 13	
				176,133 23
Distribution Department:				
Superintendence			$15,875 07	
Labor			156,957 71	
Supplies and expenses			78,365 98	
			$251,198 76	
Credit on account of stock transfers			1,543 41	
				249,655 35
Pumping Service:				
Superintendence			$9,890 84	
Arlington Pumping Station:				
Labor		$18,294 48		
Fuel		3,372 71		
Oil, waste and packing		274 29		
Repairs		699 26		
Supplies		677 52		
			23,318 26	
Chestnut Hill High Service Station, No. 1:				
Labor		$31,553 86		
Fuel		14,263 21		
Oil, waste and packing		1,211 89		
Repairs		9,836 96		
Supplies		1,179 06		
			58,044 98	
Chestnut Hill High Service Station, No. 2:				
Labor		$50,212 97		
Fuel		26,541 74		
Oil, waste and packing		1,376 95		
Repairs		13,221 88		
Supplies		1,048 37		
			92,401 91	

Metropolitan Water Maintenance Fund —General—Concluded

Spot Pond Pumping Station:			
Labor	$21,940 84		
Fuel	11,162 80		
Oil, waste and packing	503 86		
Repairs	1,640 02		
Supplies	916 87		
		$36,164 39	
Hyde Park Pumping Station:			
Labor	$13,083 37		
Fuel	1,346 37		
Oil, waste and packing	178 45		
Repairs	279 60		
Supplies	654 46		
		15,542 25	
Booster pumping		4,592 79	
			239,955 42
			935,292 73
Balance, Dec. 1, 1930			$29,140 13

METROPOLITAN WATER MAINTENANCE FUND—SPECIALS

New Northern High Service Pipe Lines

Appropriation (Chapter 138, Acts o 1927, Item 712)	$15,000 00
" (Chapter 127, Acts of 1928, Item 717)	325,000 00
	$340,000 00
Expended to Nov. 30, 1929	251,069 86
	$88,930 14

Expenditures

Section 53:				
Construction:				
Contract:				
C. & R. Construction Co.	$28,377 39			
Labor and materials	3,736 11			
		$32,113 50		
Engineering:				
Services	$5,988 54			
Expenses	64 65			
		6,053 19		
			$38,166 69	
Section 54:				
Construction:				
Contract:				
John Williams	$5,448 39			
Labor and materials	1,363 15			
		$6,811 54		
Engineering:				
Services	$13,294 49			
Expenses	269 22			
		13,563 71		
Legal				
Services	$62 53			
Expenses	6 00			
		68 53		
Advertising		24 75		
			20,468 53	
Section 55:				
Construction:				
Labor and material		$3,393 90		
Engineering:				
Services	$1,750 23			
Expenses	104 73			
		1,854 96		
Advertising		22 90		
			5,271 76	
				$63,906 98
Stock:				
Contract·				
Warren Foundry and Pipe Co.			$31,330 32	
Stock transferred to other accounts			6,307 16	
				25,023 16
				88,930 14

Additional Equipment, Pumping Stations

Appropriation (Chapter 115, Acts of 1930, Item 771)	$10,000 00

Expenditures

Construction:			
Contracts:			
D. M. Dillon Steam Boiler Works		$6,845 00	
F. Pritchard and Son, Inc.		720 00	
			$7,565 00
Labor and materials			1,249 86
			8,814 86
Balance, Dec. 1, 1930			$1,185 14

Analysis of 1930 Receipts

Credited to:			
Metropolitan Water Loan Interest Fund		$241 37	
Metropolitan Water Construction Fund		13,912 10	
Metropolitan Water Sinking Fund		147,400 74	
Metropolitan Water Maintenance Fund		1,485 16	
			$163,039 37

BONDS, SINKING FUNDS AND NET DEBT

Metropolitan Water Construction:			
Bonds issued:			
Sinking Fund:			
Year ending Nov. 30, 1930			
Period prior to Dec. 1, 1929	$41,398,000 00		
		$41,398,000 00	
Serial Bonds:			
Year ending Nov. 30, 1930			
Period prior to Dec. 1, 1929	$4,287,000 00		
		4,287,000 00	
			$45,685,000 00
Serial Bonds paid:			
Year ending Nov 30, 1930		$115,000 00	
Period prior to Dec. 1, 1929		967,000 00	
			1,082,000 00
Bonds outstanding Dec. 1, 1930			$44,603,000 00
Sinking Fund:			
Total, Dec. 1, 1930			$28,673,516 38
Total, Dec. 1, 1929			27,289,232 99
Increase during 1930			$1,384,283 39
Net Debt:			
Total, Dec. 1, 1930			$15,929,483 62
Total, Dec. 1, 1929			17,428,767 01
Decrease during 1930			$1,499,283 39
Metropolitan Additional Water Construction:			
Bonds issued:			
Serial Bonds:			
Year ending Nov. 30, 1930		$3,500,000 00	
Period prior to Dec. 1, 1929		11,000,000 00	
			$14,500,000 00
Serial Bonds paid:			
Year ending Nov. 30, 1930		$380,000 00	
Period prior to Dec. 1, 1929		235,000 00	
			615,000 00
Bonds outstanding Dec. 1, 1930			$13,885,000 00
Net Debt: (under Metropolitan District Water Supply Commission)			
Total, Dec. 1, 1930			$13,885,000 00
Total, Dec. 1, 1929			10,765,000 00
Increase during 1930			$3,120,000 00
Total Net Debt, Dec. 1, 1930			$29,814,483 62
Total Net Debt, Dec. 1, 1929			28,193,767 01
Total increase during 1930			$1,620,716 61

Appendix No. 1

Contracts Made and Pending During

Contract Number	WORK	Number of Bids	Lowest
132	Construction of Pilgrim Boulevard, Quincy.	9	$28,262 50
137[1]	Resurfacing Embankment Road, Beacon Street to Charles Street, Boston.	19	40,857 50
138[1]	Resurfacing Memorial Drive, Hingham Street to River Street, Cambridge.	16	31,576 50
139[1]	Rebuilding steps and walks at Bunker Hill Monument, Charlestown.	11	9,200 00
139A[1]	Grading and other improvements on the grounds at Bunker Hill Monument, Charlestown.	11	1,794 00
140	Drainage improvements, Malden, Everett, Revere.	10	27,000 00
141[1]	Construction of East Milton Street, Hyde Park Avenue easterly to near Neponset River, Boston (Hyde Park District).	15	41,292 50
142[2]	Construction of Forest and Main Streets, Medford and Stoneham.	15	183,875 00
143	Resurfacing South Border Road, Medford and Winchester.	17	41,650 00
144[1]	Resurfacing Hillside Street, Milton.	11	6,505 00
145[1]	Resurfacing Wyoming Avenue, Stoneham.	9	8,306 50
146[1]	Resurfacing Memorial Drive, Boylston Street to Ash Street, Cambridge.	12	28,881 00
147	Construction of Traffic Circle at the junction of Middlesex Fells Parkway and Revere Beach Parkway, Medford.	10	19,474 50
148[3]	Drainage in Blue Hills Parkway, Milton.	21	15,175 50
149[1]	Furnishing and erecting chain link fence, Soldiers Field Road, Boston (Brighton District).	5	4,785 00

[1] Contract completed.
[2] Fourth lowest bidder.
[3] One half the cost of this work is to be paid by the Metropolitan District Commission and one half by the town of Milton.

Appendix No. 1

the Year 1930—Parks Division

Contractor	Date of Contract	Date of Completion	Value of Work done Dec. 31, 1930
C. M. Callahan, Inc.	Sept. 25, 1930		$29,764 91
John McCourt Co.	Mar. 27, 1930	May 29, 1930	42,462 30
John McCourt Co.	Mar. 27, 1930	May 21, 1930	35,122 60
Banspar Construction Company	April 10, 1930	June 16, 1930	9,505 53
Banspar Construction Company	April 10, 1930	June 16, 1930	1,794 00
M. McDonough Company	May 15, 1930		25,495 00
Thomas Joseph McCue	May 29, 1930	Nov. 14, 1930	42,337 87
C. & R. Construction Company	July 17, 1930		196,902 59
M. McDonough Company	Sept. 4, 1930		48,399 40
A. G Tomasello & Son, Inc.	Sept. 11, 1930	Oct. 2, 1930	6,270 95
M. McDonough Company	Sept. 11, 1930	Nov. 30, 1930	8,099 91
John McCourt Company	Sept. 4, 1930	Oct. 10, 1930	27,961 10
M. McDonough Company	Sept. 11, 1930		20,864 03
John P. Condon Corporation	Sept. 25, 1930		16,534 49
W. A. Snow Iron Works, Inc.	Nov. 10, 1930	Dec. 15, 1930	4,775 83

Appendix No. 2

Contracts Made and Pending During

(The details of Contracts made before

1 Number of Contract	2 WORK	3 Number of Bids	Amount of Bid 4 Next to Lowest	Amount of Bid 5 Lowest	6 Contractor
72[1]	Street Chambers for Venturi Meter Registers.	7	$3,210 00	$3,048 00[2]	Walsh Holyoke Steam Boiler Works, Inc., Holyoke.
73[1]	Furnishing and laying 60-inch electric-welded steel Water Pipes in Boston.	9	115,945 00	102,410 00[2]	C. and R. Construction Co., Boston.
74[1]	Furnishing 2,614 tons cast-iron Water Pipes and Special Castings: 44 tons 6-inch to 12-inch, 2,180 tons 16-inch to 30-inch, 29 tons 36-inch and 120 tons 60-inch bell and spigot pipes; 61 tons 12-inch to 24-inch flexible joint pipes and 180 tons special castings.	3	126,466 25	124,365 50[2]	Warren Foundry & Pipe Co., Phillipsburg, N. J.
75[1]	Laying cast-iron Water Pipes, furnished by the Commonwealth, in Revere.	13	20,695 90	20,088 00[2]	John Williams, Boston.
76	Laying cast-iron Water Pipes, furnished by the Commonwealth, in Revere.	14	35,864 50	32,742 00[2]	Cenedella & Co., Milford, Mass.
77[1]	Furnishing Equipment for Chlorinating Plants at Weston Reservoir and Framingham Dam No. 1.	–[3]	–[3]	–[3]	Wallace & Tiernan Co., Inc., Newark N. J.

[1]Contract completed.
[2]Contract based upon this bid.
[3]Competitive bids were not received.
[4]Work finished but final payment not made.

Appendix No. 2

the Year 1930—Water Division

1930 have been given in previous reports.)

7 Date of Contract	8 Date of Completion of Contract	9 Prices of Principal Items of Contract	10 Value of Work done Dec. 31, 1930
Jan. 2, 1930	Mar. 10, 1930	For 10 Venturi register chambers $252.00 each; for 12 sets frames and covers $44.00 per set.	$3,056 68
April 18, 1930	Dec. 6, 1930	For furnishing and laying electric-welded steel pipes, $17.50 per lin. ft.; for laying cast-iron pipes furnished by the Commonwealth, 12-inch and 16-inch pipes $2.00, and 6-inch pipes $1.00 per lin. ft.; for rock excavation $1.00 per cu. yd.; for earth excavation $2.00 per cu. yd.; for chambers for 36-inch gate valves, blow-off and by-pass valves $100.00 per chamber; for chambers for air valves and manholes $60.00 per chamber; for concrete masonry $9.00 per cu. yd.; for bituminous macadam resurfacing $0.90 per sq. yd.; for granite block resurfacing $0.30 per sq. yd.	113,003 29
June 3, 1930	–[4]	For 6-inch, 8-inch and 12-inch straight pipes $41.30 per ton of 2000 lbs.; for 16-inch, 20-inch, 24-inch, 30-inch, 36-inch and 60-inch straight pipes $41.20 per ton of 2000 lbs.; for 12-inch, 20-inch and 24-inch flexible-joint pipes $61.20 per ton of 2000 lbs.; for special castings $119.00 per ton of 2000 lbs.	126,056 07
July 19, 1930	–[4]	For laying 24-inch cast-iron pipes with ordinary joints $3.00 per lin. ft.; for laying 24-inch cast-iron pipes with flexible joints $10.00 per lin. ft.; for rock excavation $10.00 per cu. yd.; for earth excavation $3.00 per cu. yd.; for chambers for gate valves, blow-off and air valves $115.00 per chamber; for concrete masonry $8.00 per cu. yd.; for resurfacing granite block and bituminous macadam pavements $2.00 per sq. yd.; for resurfacing granolithic sidewalks $0.30 per sq. yd.	23,196 71
Aug. 30, 1930	–	For laying 20-inch cast-iron pipes $1.90 per lin. ft.; for laying 16-inch cast-iron pipes $1.70 per lin. ft.; for rock excavation $15.00 per cu. yd.; for earth excavation $3.00 per cu. yd.; for chambers for 20-inch gate valves $190.00 per chamber; for chambers for 16-inch gate valves, blow-off and air valves $100.00 per chamber; for concrete masonry $13.00 per cu. yd.; for resurfacing concrete and bituminous macadam pavements $1.35 per sq. yd.; for resurfacing granolithic sidewalks $1.95 per sq. yd.	34,875 69
Oct. 8, 1930	–[4]	For Weston Aqueduct equipment including 3 Manual control solution feed chlorinators, type MSV, with external injectors, 2 LeCourtenay single stage pumps directly connected to 2 5-H.P. electric motors and an Apco priming tank, maximum capacity 300 lbs. chlorine in 24 hours $6,050.00; for Sudbury Aqueduct equipment including 1 Manual control solution feed chlorinator, type MSV, similar to the Weston Aqueduct installation $2,900.00.	8,950 00

Contracts Made and Pending During

1 Number of Contract	2 WORK	3 Number of Bids	Amount of Bid 4 Next to Lowest	Amount of Bid 5 Lowest	6 Contractor
78	Furnishing 6 20-inch Gate Valves.	3	$5,250 00	$4,170 00[2]	The Chapman Valve Manufacturing Co., Indian Orchard, Mass.
35-M	Sale and Purchase of Electric Energy to be developed at Wachusett Dam in Clinton.	–[3]	–[3]	–[3]	New England Power Company and Edison Electric Illuminating Company of Boston.
36-M	Sale and Purchase of Electric Energy to be developed at Sudbury Dam in Southborough.	–[3]	–[3]	–[3]	Edison Electric Illuminating Company of Boston.
39-M[1]	2 Special Type Y Register Indicator Recorders.	–[3]	–[3]	–[3]	Builders Iron Foundry, Providence, R. I.
40-M[1]	Switching Equipment at Wachusett Power Station, Clinton.	–[3]	–[3]	–[3]	Westinghouse Electric & Manufacturing Company, Pittsburgh, Penn.
41-M[1]	Vertical Fire-tube Boiler for Spot Pond Pumping Station.	4	7,447 00	6,845 00[2]	D. M. Dillon Steam Boiler Works, Fitchburg, Mass.
42-M[1]	Painting Steel Tank of Arlington Reservoir.	8	1,230 00	885 00[2]	Shrewsbury Tank Company, Worchester, Mass.
43-M[1]	Furnishing and erecting Fences for Fisher Hill and Waban Hill Reservoirs.	4	6,015 42	5,885 35[2]	W. A. Snow Iron Works, Inc., Boston.
44-M[1]	Removing an old Boiler and erecting a new Boiler at Spot Pond Pumping Station.	4	738 00	720 00[2]	F. Pritchard & Son, Inc., Watertown, Mass.
45-M[1]	Non-Heat-Conducting Covering for Boiler at Spot Pond Pumping Station.	3	587 00	490 00[2]	Keasbey & Mattison Company, Boston.

[1] Contract completed.
[2] Contract based upon this bid.
[3] Competitive bids were not received,
[4] Work finished but final payment not made.

THE YEAR 1930—WATER DIVISION—Continued

7 Date of Contract	8 Date of Completion of Contract	9 Prices of Principal Items of Contract	10 Value of Work done Dec. 31, 1930
Oct. 11, 1930	–	For 20-inch gate valves $695.00 each.	$4,200 00
Mar. 1, 1929	–	Sale and purchase to include on week days, excepting Saturday afternoons and legal holidays, all electricity generated after deduction of that used by Commission in connection with operation of its works in Wachusett Section. Contract to continue until terminated by either party by giving 6 months' notice, but not earlier than March 1, 1939.	91,406 54
Mar. 1, 1929	–	Sale and purchase to include all electricity generated after deduction of that used by Commission in connection with operation of its Sudbury Power Station. Contract to continue for 10 years.	56,850 12
Nov. 12, 1929	Jan. 2, 1930	See Annual Report for 1929	1,200 00
Dec. 12, 1929	April 29, 1930	See Annual Report for 1929.	8,495 97
May 8, 1930	Sept. 3, 1930	For building vertical fire-tube boiler, 98 inches in diameter and 24 feet in height, with appurtenances, for working steam pressure of 185 pounds per square inch, $6,845 00.	6,845 00
May 3, 1930	May 28, 1930	For cleaning and painting the steel tank of the Arlington Reservoir with ingredients furnished by the Commonwealth, $885.00.	885 00
May 26, 1930	Oct. 4, 1930	For furnishing and erecting picket fence $2.31 per lin. ft.; for furnishing and erecting chain-link fence $1.525 per lin. ft.	5,965 43
July 28, 1930	Sept. 12, 1930	For removing and disposing of old boiler $180.00; for unloading new boiler from freight car, transporting and erecting it on foundation at Spot Pond Pumping Station $540.00.	720 00
Oct. 14, 1930	Nov. 29, 1930	For furnishing and applying non-heat-conducting covering to boiler No. 24, with smoke bonnet and miscellaneous piping, at Spot Pond Pumping Station $379.00; for removing surface layer of non-heat-conducting covering of boiler No. 23 and resurfacing in satisfactory manner $111.00.	490 00

Contracts Made and Pending during the Year 1930—Water Division
Concluded

Summary of Contracts, 1895 to 1930, Inclusive [1]

	Value of Work done Dec. 31, 1930
Distribution Section, 7 contracts	$313,338 44
471 contracts completed from 1896 to 1929	21,499,001 80
	$21,812,340 24
Deduct for work done on 11 Sudbury Reservoir contracts by the city of Boston	512,000 00
Total of 478 contracts	$21,300,340 24

[1] In this summary contracts for the sale of used material and contracts charged to maintenance are excluded.

Appendix No. 3

Table No. 1. — *Monthly Rainfall in Inches at Various Places on the Metropolitan Water Works, 1930*

Place	January	February	March	April	May	June	July	August	September	October	November	December	Totals
Wachusett Watershed:													
Princeton	1.87	2.25	3.43	2.05	2.86	3.58	6.07	1.81	1.59	2.68	3.72	2.69	34.60
Jefferson	2.12	2.58	3.73	2.09	2.93	3.54	5.93	1.78	2.58	3.80	3.97	2.34	37.39
Sterling	2.11	1.80	3.72	1.57	2.45	2.74	6.63	1.49	1.64	3.63	4.09	2.45	34.32
Boylston	2.34	2.16	3.74	1.79	2.86	1.99	4.23	1.70	1.83	4.08	3.91	2.94	33.57
Sudbury Watershed:													
Sudbury Dam	2.63	2.55	3.79	2.12	3.75	1.62	3.75	2.71	0.96	4.29	4.22	2.60	34.99
Framingham	2.78	2.52	3.66	2.07	2.91	1.65	3.92	2.32	0.80	4.62	4.44	2.46	34.15
Ashland Dam	2.57	2.54	3.93	1.99	2.72	1.62	4.25	1.60	0.68	4.43	4.27	2.41	33.01
Cordaville	2.51	2.48	3.96	2.05	2.90	1.60	4.41	3.34	0.81	4.13	4.50	2.75	35.44
Lake Cochituate	2.70	2.48	3.57	1.94	2.67	2.38	3.32	2.02	0.78	4.55	4.30	2.98	33.69
Chestnut Hill Reservoir	3.03	2.30	3.37	2.17	3.21	1.99	3.71	2.86	0.51	6.02	4.15	3.10	36.42
Spot Pond	2.98	2.67	3.71	2.07	3.35	2.37	5.33	3.07	0.45	5.08	4.66	2.85	38.59
Average of all	2.51	2.39	3.69	1.99	2.97	2.28	4.69	2.25	1.15	4.30	4.20	2.69	35.11
Average, Wachusett Watershed	2.11	2.19	3.66	1.88	2.78	2.96	5.72	1.69	1.91	3.55	3.92	2.61	34.98
Average, Sudbury Watershed	2.62	2.52	3.84	2.06	3.07	1.62	4.08	2.49	0.81	4.36	4.36	2.56	34.39

TABLE NO. 2. — *Rainfall in Inches at Chestnut Hill Reservoir, 1930*

DATE	Amount	Duration
Jan. 1 . .	.10	7.00 P.M. to
Jan. 2 . .		2.30 A.M.
Jan. 3 . .	.31	2.20 A.M. to 3.30 P.M.
Jan. 9 . .	.03	2.15 P.M. to
Jan 10 . .		5.45 A.M.
Jan. 10 . .	.03[2]	10.30 A.M. to 2.30 P.M.
Jan. 11 . .	.63[2]	2.45 P.M. to
Jan. 12 . .		5.20 P.M.
Jan. 13 . .	.02	3.00 P.M. to 3.30 P.M.
Jan. 14 . .	.86	9.00 A.M. to
Jan. 15 . .		8.00 A.M.
Jan. 18 . .	.58[2]	7.45 A.M. to 4.45 P.M.
Jan. 21 . .	.20	6.20 A.M. to 7.00 P.M.
Jan. 22 . .	.04	10.30 A.M. to 2.30 P.M.
Jan. 27 . .	.10[1]	6.30 P.M. to
Jan. 28 . .		2.00 A.M.
Jan. 30 . .	.13[1]	8.30 A.M. to 11.30 P.M.
	3.03	
Feb. 2 . .	.11	8.40 P.M. to
Feb. 3 . .		11.00 A.M.
Feb. 4 . .	.40[2]	3.30 P.M. to
Feb. 5		6.30 A.M.
Feb. 7 . .	.03[1]	5.30 A.M. to 1.00 P.M.
Feb. 9 . .	.07[2]	8.10 P.M. to
Feb. 10		4.00 P.M.
Feb. 13 . .	1.04[2]	10.30 A.M. to
Feb. 14		4.15 A.M.
Feb. 15 . .	.46[1]	5.30 P.M. to
Feb. 16		6.30 A.M.
Feb. 23 . .	.11	11.00 P.M. to
Feb. 24		3.00 A.M.
Feb. 25 . .	.08	7.00 A.M. to 9.45 P.M.
	2.30	
Mar. 2 . .	.10	2.15 A.M. to 12.00 M.
Mar. 7 . .	1.28	3.00 P.M. to
Mar. 9		12.15 A.M.
Mar. 11 . .	.14	5.15 P.M. to
Mar. 12		1.45 A.M.
Mar. 17 . .	.32[2]	8.30 A.M. to
Mar. 18		7.15 A.M.
Mar. 18 . .	.37	7.40 P.M. to
Mar. 19		4.45 A.M.
Mar. 25 . .	1.12	2.25 A.M. to
Mar. 26		4.45 A.M.
Mar. 30 . .	.04	6.55 P.M. to 11.10 P.M.
	3.37	
Apr. 2 . .	.10	5.00 A.M. to 7.10 A.M.
Apr. 6 . .	1.06	7.00 P.M. to
Apr. 7		7.15 A.M.
Apr. 7 . .	.01	12.00 M. to 8.00 P.M.
Apr. 13 . .	.02	12.20 P.M. to 11.00 P.M.
Apr. 17 . .	.19	2.00 P.M. to
Apr. 18		4.30 A.M.
Apr. 18 . .	.71	2.00 P.M. to
Apr. 19		4.45 A.M.
Apr. 22 . .	.08	3.30 A.M. to 11.00 A.M.
	2.17	
May 1 . .	.18	10.15 P.M. to
May 3		2.15 A.M.
May 8 . .	.28	6.00 A.M. to 7.15 A.M.
May 8 . .	.37	5.30 P.M. to 6.30 P.M.
May 15 . .	.81	12.30 A.M. to
May 16		1.15 A.M.
May 16 . .	.06	4.35 P.M. to 6.40 P.M.
May 19 . .	.26	11.00 A.M. to
May 20		7.15 A.M.
May 23 . .	.02	8.30 A.M. to 10.30 A.M.
May 25 . .	.58	11.00 A.M. to
May 26		5.45 P.M.
May 27 . .	.06	9.30 A.M. to 12.30 P.M.
May 28 . .	.30	3.15 P.M. to
May 29		2.15 A.M.
May 29 . .	.29	6.30 P.M. to
May 30		12.10 A.M.
	3.21	
June 7 . .	.48	5.45 P.M. to
June 9		9.00 P.M.
June 10 . .	.37	4.40 P.M. to
June 12		10.30 A.M.
June 17 . .	.72	5.50 P.M. to
June 18		6.00 P.M.
June 19 . .	.14	3.50 P.M. to 7.15 P.M.
June 21 . .	.09	4.40 P.M. to 6.15 P.M.
June 22 . .	.04	8.10 P.M. to 8,45 P.M.
June 27 . .	.15	10.00 A.M. to 1.30 P.M.
	1.99	
July 2 . .	.02	5.30 A.M. to 6.00 A.M.
July 4 . .	.02	4.00 A.M. to 6.00 A.M.
July 6 . .	.95	9.00 A.M. to 10.10 P.M.
July 7 . .	.13	4.50 P.M. to 6.00 P.M.
July 9 . .	.23	2.15 P.M. to 9.20 P.M.
July 11 . .	.07	5.00 P.M. to 7.20 P.M.
July 14 . .	1.25	12.05 P.M. to 4.30 P.M.
July 21 . .	.30	5.50 P.M. to 9.30 P.M.
July 22 . .	.13	8.15 A.M. to 5.30 P.M.
July 24 . .	.09	3.10 P.M. to 9.10 P.M.
July 25 . .	.20	3.26 P.M. to 3.50 P.M.
July 27 . .	.32	1.00 A.M. to 7.00 A.M.
	3.71	
Aug. 4 . .	.05	7.35 P.M. to 11.39 P.M.
Aug. 7 . .	.52	8.15 P.M. to
Aug. 8		3.30 A.M.
Aug. 9 . .	.01	7.00 A.M. to 10.00 A.M.
Aug. 10 . .	.02	12.00 M. to 1.00 P.M.
Aug. 15 . .	1.22	2.50 A.M. to 11.30 P.M.
Aug. 16 . .	.17	1.20 P.M. to 3.35 P.M.
Aug. 23 . .	.87	6.35 A.M. to 7.00 P.M.
	2.86	
Sept. 1 . .	.09	8.00 A.M. to 2.00 P.M.
Sept. 6 . .	.37	8.00 P.M. to
Sept. 7		12.30 A.M.
Sept. 8 . .	.05	1.15 A.M. to 9.30 A.M.
	.51	
Oct. 8 . .	.04	7.00 P.M. to
Oct. 9		7.00 A.M.
Oct. 15 . .	3.34	2.30 A.M. to
Oct. 16		5.45 A.M.
Oct. 17 . .	.25	8.15 P.M. to
Oct. 18		7.15 A.M.
Oct. 24 . .	1.47	5.20 A.M. to
Oct. 26		4.30 A.M.
Oct. 28 . .	.02	8.45 A.M. to 10.45 A.M.
Oct. 29 . .	.47	10.00 A.M. to
Oct. 30		7.30 A.M.
Oct. 31 . .	.45	4.20 A.M. to 4.00 P.M.
	6.02	
Nov. 4 . .	.96	6.45 P.M. to
Nov. 6 . .		1.45 A.M.
Nov. 12 . .	.04	8.30 P.M. to
Nov. 13		7.00 A.M.
Nov. 15 . .	2.10	12.15 A.M. to
Nov. 19		3.30 A.M.
Nov. 24 . .	.51	5.25 P.M. to
Nov. 25		7.30 A.M.
Nov. 25 . .	.02	2.15 P.M. to 3.30 P.M.
Nov. 30 . .	.52	5.40 P.M. to
Nov. 31		6.20 A.M.
	4.15	
Dec. 11 . .	.20	2.45 P.M. to
Dec. 12 . .		7.30 A.M.
Dec. 19 . .	.41	10.45 P.M. to
Dec. 20		5.30 A.M.
Dec. 23 . .	.74[1]	12.50 A.M. to 5.00 P.M.
Dec. 26 . .	1.75[2]	5.30 P.M. to
Dec. 27		8.00 P.M.
	3.10	

Total for year, 36.42 inches.

[1] Snow.

[2] Rain and snow.

Table No. 3. — *Wachusett System — Statistics of Flow of Water, Storage and Rainfall in 1930*

[Watershed above dam = 108.84 square miles.]

Month	Gallons per Day										Rainfall (Inches)	Rainfall Collected (Inches)	Percentage of Rainfall Collected
	Taken by Town of Clinton	Taken by City of Worcester	Received from City of Worcester Watershed	Discharged into Wachusett Aqueduct[1]	Wasted into River below Dam	Seepage through the North Dike[2]	Storage[3]		Total Yield of Watershed	Yield per Square Mile			
							Gain	Loss					
January	490,000	–	–	105,878,000	1,710,000	700,000	–	38,268,000	70,510,000	648,000	2.11	1.156	54.8
February	379,000	–	–	111,728,000	1,743,000	689,000	–	20,214,000	94,325,000	867,000	2.20	1.396	63.5
March	351,000	–	–	69,345,000	1,729,000	697,000	58,813,000	–	130,935,000	1,203,000	3.65	2.146	58.7
April	380,000	–	–	100,136,000	1,742,000	701,000	955,000	–	103,914,000	955,000	1.88	1.646	87.8
May	416,000	–	–	109,174,000	1,658,000	700,000	–	48,529,000	63,419,000	583,000	2.77	1.039	37.5
June	347,000	–	–	110,756,000	1,707,000	690,000	–	64,757,000	48,743,000	448,000	2.96	0.773	26.1
July	290,000	1,752,000	–	137,281,000	1,716,000	664,000	–	92,416,000	49,287,000	453,000	5.72	0.808	14.1
August	348,000	5,561,000	–	137,619,000	1,713,000	629,000	–	121,538,000	24,332,000	224,000	1.69	0.399	23.5
September	339,000	5,243,000	–	134,090,000	1,711,000	606,000	–	116,428,000	25,561,000	235,000	1.91	0.406	21.3
October	445,000	5,406,000	–	138,465,000	1,710,000	548,000	–	106,642,000	39,932,000	367,000	3.55	0.655	18.4
November	433,000	5,250,000	–	2,603,000	1,725,000	500,000	40,584,000	–	51,093,000	469,000	3.92	0.810	20.7
December	19,000	5,287,000	–	103,200,000	1,723,000	290,000	–	70,174,000	40,345,000	371,000	2.61	0.661	25.4
Total	–	–	–	–	–	–	–	–	–	–	34.97	11.895	–
Av. for Yr.	353,000	2,392,000	–	105,171,000	1,715,000	617,000	–	48,607,000	61,641,000	566,000	–	–	34.0

[1] Including 179,000 gallons per day drawn from aqueduct for the supply of the Westborough State Hospital.
[2] Estimated.
[3] Aggregate storage in Wachusett Reservoir and in ponds and mill reservoirs.

TABLE No. 4. — *Sudbury System — Statistics of Flow of Water, Storage and Rainfall in 1930*

[Watershed=75.2 square miles.]

MONTH	GALLONS PER DAY													
	Water received from Wachusett Reservoir[1]	Water discharged through Sudbury Aqueduct	Water discharged through Weston Aqueduct	Water used by Framingham Water Works	Water diverted from Watershed by Sewers, etc.	Water wasted from Farm Pond	Water wasted into River below Lowest Dam	STORAGE		Total Yield of Watershed	Yield per Square Mile	Rainfall (Inches)	Rainfall Collected (Inches)	Percentage of Rainfall Collected
								Gain	Loss					
Jan.	105,703,000	32,736,000	100,816,000	1,519,000	419,000	–	27,752,000	–	10,629,000	46,910,000	624,000	2.62	1.113	42.4
Feb.	111,532,000	32,071,000	101,118,000	1,561,000	757,000	–	34,768,000	11,975,000	–	70,718,000	940,000	2.52	1.515	60.1
Mar.	69,168,000	27,881,000	100,126,000	1,432,000	1,274,000	168,000	51,245,000	–	4,019,000	108,939,000	1,449,000	3.84	2.584	67.4
Apr.	99,945,000	27,398,000	99,856,000	1,248,000	1,062,000	73,000	34,241,000	10,601,000	–	74,534,000	991,000	2.06	1.709	83.0
May	108,974,000	33,945,000	98,613,000	1,332,000	691,000	–	14,313,000	–	9,497,000	30,423,000	405,000	3.07	0.722	23.5
June	110,557,000	45,370,000	95,700,000	1,617,000	340,000	–	6,290,000	–	35,387,000	3,373,000	45,000	1.62	0.077	4.8
July	137,077,000	44,432,000	97,461,000	1,519,000	377,000	–	3,200,000	–	11,664,000	–1,752,000	–23,000	4.08	–0.041	–1.0
Aug.	137,439,000	38,561,000	98,410,000	1,597,000	387,000	–	1,574,000	–	9,303,000	–6,213,000	–83,000	2.49	–0.147	–5.9
Sept.	133,924,000	33,114,000	100,644,000	1,558,000	413,000	–	1,501,000	–	16,910,000	–13,604,000	–181,000	0.81	–0.313	–38.5
Oct.	138,294,000	33,555,000	99,594,000	1,406,000	297,000	–	1,500,000	4,148,000	–	2,206,000	29,000	4.37	0.052	1.2
Nov.	2,457,000	27,407,000	100,070,000	1,263,000	453,000	–	10,554,000	–	99,810,000	37,480,000	498,000	4.36	0.860	19.7
Dec.	103,052,000	23,803,000	88,413,000	1,577,000	423,000	–	6,358,000	–	6,935,000	10,587,000	141,000	2.56	0.251	9.8
Total	–	–	–	–	–	–	–	–	–	–	–	34.40	8.382	–
Av. for Yr.	104,991,000	33,368,000	98,372,000	1,469,000	573,000	20,000	15,983,000	–	14,783,000	30,011,000	399,000	–	–	24.4

[1] Not including 179,000 gallons per day drawn from the Wachusett Aqueduct for the supply of the Westborough State Hospital, not discharged into Sudbury Reservoir.

TABLE NO. 5. — *Cochituate System — Statistics of Flow of Water, Storage and Rainfall in 1930*

[Watershed of Lake = 17.58 square miles. [1]]

MONTH	GALLONS PER DAY							Rainfall (Inches)	Rainfall Collected (Inches)	Percentage of Rainfall Collected
	Water discharged through Cochituate Aqueduct	Water diverted from Watershed by Sewers, etc.	Water wasted at Outlet of Lake	STORAGE		Total Yield of Watershed	Yield per Square Mile			
				Gain	Loss					
January	–	413,000	20,245,000	–	6,800,000	13,858,000	788,000	2.70	1.41	52.1
February	–	418,000	9,682,000	7,950,000	–	18,050,000	1,027,000	2.48	1.65	66.7
March	–	816,000	22,262,000	–	1,826,000	21,252,000	1,209,000	3.57	2.16	60.4
April	–	908,000	13,722,000	237,000	–	14,867,000	846,000	1.94	1.46	75.1
May	658,000	361,000	1,784,000	2,436,000	–	5,239,000	298,000	2.67	0.53	19.9
June	–	157,000	–	1,976,000	–	2,133,000	121,000	2.38	0.21	8.8
July	–	42,000	–	993,000	–	1,035,000	59,000	3.32	0.11	3.2
August	2,119,000	–94,000	–	–	3,135,000	–1,110,000	–63,000	2.02	–0.11	–5.6
September	12,682,000	–33,000	–	–	13,528,000	–879,000	–50,000	0.78	–0.09	–11.1
October	2,071,000	113,000	–	1,900,000	–	4,084,000	232,000	4.55	0.41	9.1
November	–	420,000	–	7,113,000	–	7,533,000	429,000	4.30	0.74	17.2
December	7,413,000	210,000	–	–	2,642,000	4,981,000	283,000	2.98	0.50	17.0
Total	–	–	–	–	–	–	–	33.69	8.98	–
Average for year	2,085,000	310,000	5,631,000	–	508,000	7,518,000	428,000	–	–	26.7

[1] Not including the watersheds of Dudley and Dug ponds.

TABLE NO. 6. — *Sources from which and Periods during which Water has been drawn for the Supply of the Metropolitan Water District*

From Wachusett Reservoir into the Wachusett Aqueduct

MONTH	Number of Days during which Water was Flowing	ACTUAL TIME		Million[1] Gallons Drawn
		Hours	Minutes	
January	26	226	40	3,282.2
February	23	215	36	3,128.4
March	26	148	23	2,149.7
April	20	205	28	2,999.9
May	26	232	14	3,384.4
June	25	228	20	3,322.7
July	26	295	54	4,255.7
August	26	297	30	4,266.2
September	25	315	11	4,028.3
October	26	349	19	4,292.4
November	2	9	42	78.1
December	20	269	24	3,199.2
Totals	271	116.403 days		38,387.2

[1]Including quantity supplied to Westborough State Hospital.

From Sudbury Reservoir through the Weston Aqueduct to Weston Reservoir

MONTH	Number of Days during which Water was Flowing	ACTUAL TIME		Million Gallons Drawn
		Hours	Minutes	
January	31	624	00	3,125.3
February	28	570	00	2,831.3
March	31	631	30	3,103.9
April	30	606	30	2,991.5
May	31	631	30	3,057.0
June	30	608	30	2,871.0
July	31	629	03	3,021.3
August	31	622	05	3,050.7
September	30	618	39	3,023.5
October	31	624	26	3,087.4
November	30	624[1]	00	3,002.1[1]
December	31	744[2]	00	2,740.8[2]
Totals	365	313.93 days		35,905.8

[1] Included in this time, and in the amount of water, is 12 hrs. 45 min. and 40,000,000 gallons of water by-passed.
[2] The total amount for this month was by-passed.

From Framingham Reservoirs Nos. 1 and 3, Lake Cochituate and Ashland Reservoir through the Sudbury Aqueduct to Chestnut Hill Reservoir

MONTH	Number of Days during which Water was Flowing	Actual Time (Hours)	Million Gallons Drawn
January	31	744	1,014.8
February	28	672	898.1
March	31	744	864.3
April	30	719[1]	821.9
May	31	744	1,052.3
June	30	720	1,361.1
July	31	744	1,377.4
August	31	744	1,195.4
September	30	721[1]	993.5
October	31	744	1,040.2
November	30	720	822.2
December	31	744	737.9
Totals	365	365 days	12,179.2

[1] Change for daylight saving time.

TABLE No. 7. — *Average Daily Quantity of Water flowing through Aqueducts in 1930 by Months*[1]

MONTH	Wachusett Aqueduct into Sudbury Reservoir (Gallons)	Weston Aqueduct into Metropolitan District (Gallons)	Sudbury Aqueduct into Chestnut Hill Reservoir (Gallons)	Cochituate Aqueduct into Chestnut Hill Reservoir (Gallons)
January	105,703,000	100,816,000	32,736,000	–
February	111,532,000	101,118,000	32,071,000	–
March	69,168,000	100,126,000	27,881,000	–
April	99,945,000	99,856,000	27,398,000	–
May	108,974,000	98,613,000	33,945,000	442,000
June	110,557,000	95,700,000	45,370,000	–
July	137,077,000	97,461,000	44,432,000	–
August	137,439,000	98,410,000	38,561,000	1,726,000
September	133,924,000	100,644,000	33,114,000	12,682,000
October	138,294,000	99,594,000	33,555,000	2,071,000
November	2,457,000	100,070,000	27,407,000	–
December	103,052,000	88,413,000	23,803,000	7,413,000
Average	104,991,000	98,372,000	33,368,000	2,033,000

[1] Not including quantities wasted while cleaning and repairing aqueducts.

TABLE NO. 8.— (*Meter Basis.*) *Average Daily Consumption of Water by Districts in the Cities and Towns supplied by the Metropolitan Water Works in 1930*

MONTH	LOW SERVICE	SOUTHERN HIGH SERVICE	SOUTHERN INTERMEDIATE HIGH SERVICE	NORTHERN HIGH SERVICE	SOUTHERN EXTRA HIGH SERVICE	NORTHERN EXTRA HIGH SERVICE	Total District Supplied (Gallons)	Estimated Population	Consumption per Inhabitant (Gallons)
	Portions of Arlington, Belmont, Boston, Chelsea, Everett, Malden, Medford, Somerville and Watertown (Gallons)	Quincy and Portions of Boston, Milton and Watertown (Gallons)	Portions of Belmont and Watertown (Gallons)	Melrose, Nahant, Revere, Stoneham, Swampscott and Winthrop and Portions of Boston, Chelsea, Everett, Malden, Medford and Somerville (Gallons)	Portions of Boston and Milton (Gallons)	Lexington and Portions of Arlington and Belmont (Gallons)			
January	72,881,100	45,945,700	1,298,700	11,570,400	1,369,700	1,402,400	134,468,000	1,381,360	97
February	74,253,200	46,048,400	1,318,700	11,677,000	1,374,600	1,458,300	136,130,200	1,382,740	98
March	70,804,300	45,399,400	1,316,800	11,547,100	1,361,800	1,472,600	131,902,000	1,384,110	95
April	67,986,600	44,737,700	1,364,400	11,232,100	1,363,300	1,521,500	128,205,600	1,385,490	93
May	68,988,000	46,236,100	1,463,000	12,223,400	1,454,800	1,842,700	132,208,000	1,386,860	95
June	74,969,600	49,299,100	1,571,800	13,721,600	1,542,500	2,085,400	143,190,000	1,388,230	103
July	75,432,800	48,790,700	1,547,100	13,894,700	1,510,700	1,977,000	143,153,000	1,389,610	103
August	73,607,100	48,064,900	1,481,700	13,819,400	1,502,400	1,962,000	140,437,500	1,390,970	101
September	76,296,100	50,682,300	1,662,700	13,903,300	1,693,000	2,050,800	146,288,200	1,392,320	105
October	71,736,000	47,627,100	1,489,300	12,653,700	1,547,000	1,786,400	136,839,500	1,393,680	98
November	70,711,500	45,217,400	1,364,600	12,013,600	1,449,200	1,507,900	132,264,200	1,395,040	95
December	70,757,400	45,237,700	1,296,800	11,782,700	1,436,800	1,511,400	132,022,800	1,396,390	95
For the year	72,352,000	46,941,900	1,431,600	12,507,600	1,467,400	1,716,000	136,416,500	1,389,610	98

TABLE NO. 9. — (*Meter Basis.*) *Average Daily Consumption of Water in Cities and Towns supplied by the Metropolitan Water Works in 1930*

City or town	ARLINGTON		BELMONT		BOSTON		CHELSEA		EVERETT		LEXINGTON		MALDEN	
Population	36,650		22,070		781,270		45,740		48,740		9,550		58,350	
MONTH	GALLONS		GALLONS		GALLONS		GALLONS		GALLONS		GALLONS		GALLONS	
	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita
January	1,656,500	47	1,093,900	51	93,421,600	120	3,481,500	76	4,867,400	101	534,100	57	3,503,100	61
February	1,726,600	48	1,104,800	51	94,540,100	121	3,512,600	77	5,017,400	104	563,400	60	3,450,800	60
March	1,735,900	48	1,117,600	52	90,970,200	116	3,431,700	75	5,035,100	104	564,100	60	3,349,700	58
April	1,770,400	49	1,186,300	55	88,269,900	113	3,430,300	75	4,792,800	99	585,100	62	3,153,700	54
May	2,065,400	57	1,294,100	59	89,436,300	114	3,462,100	76	4,895,500	101	695,900	73	3,410,100	59
June	2,434,600	67	1,504,500	69	95,613,900	122	3,801,000	83	5,166,600	106	718,300	75	3,959,100	68
July	2,254,500	62	1,519,800	69	95,316,800	122	3,736,600	82	5,137,100	105	692,200	72	4,041,200	69
August	2,185,500	59	1,484,400	67	93,188,200	119	3,672,900	80	4,850,000	99	720,300	75	4,015,000	69
September	2,346,300	63	1,700,000	76	96,860,500	124	3,778,500	82	5,544,400	113	699,200	73	3,905,300	67
October	1,983,400	53	1,364,800	61	91,679,500	117	3,630,800	79	4,750,600	97	676,900	70	3,677,600	63
November	1,773,500	48	1,190,500	53	88,965,300	114	3,451,400	75	4,724,200	96	569,700	59	3,636,500	62
December	1,840,600	49	1,133,000	50	89,405,700	114	3,417,100	74	4,833,300	98	537,700	56	3,628,800	62
For the year	1,982,100	54	1,308,500	59	92,286,000	118	3,569,400	78	4,966,500	102	630,100	66	3,645,600	62

TABLE No. 9. — (*Meter Basis.*) *Average Daily Consumption of Water in Cities and Towns, etc.*—Continued

City or town	MEDFORD		MELROSE		MILTON		NAHANT		QUINCY		REVERE	
Population	60,320		23,320		16,610		1,660		72,580		35,800	
MONTH	GALLONS		GALLONS		GALLONS		GALLONS		GALLONS		GALLONS	
	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita
January	3,145,500	53	1,536,300	67	766,600	47	99,500	60	5,475,700	77	2,030,200	57
February	3,217,500	54	1,549,300	67	782,800	48	109,000	66	5,542,000	77	2,043,100	57
March	3,134,700	53	1,506,000	65	766,100	47	113,000	68	5,518,900	77	1,984,600	56
April	3,156,800	53	1,460,000	63	791,800	48	105,800	64	5,336,500	74	1,958,600	55
May	3,247,600	54	1,586,700	68	873,700	53	160,100	96	5,558,100	77	2,181,700	61
June	3,511,500	58	1,729,500	74	931,600	56	298,900	180	5,632,000	78	2,471,700	69
July	3,430,200	57	1,670,900	72	883,800	53	347,400	209	5,784,300	80	2,684,500	75
August	3,390,900	56	1,656,800	71	896,800	54	358,800	216	5,625,200	77	2,671,500	74
September	3,663,400	60	1,812,400	77	1,084,500	65	321,400	194	5,547,100	76	2,459,200	68
October	3,577,300	59	1,707,300	73	978,800	58	189,800	114	5,285,200	72	2,162,300	60
November	3,527,100	58	1,676,900	71	875,400	52	131,800	79	5,404,300	74	1,996,800	55
December	3,280,700	54	1,653,000	70	791,300	47	121,900	73	5,276,500	72	2,040,200	56
For the year	3,356,900	56	1,628,900	70	868,700	52	197,000	119	5,498,700	76	2,225,200	62

TABLE No. 9. — (*Meter Basis.*) *Average Daily Consumption of Water in Cities and Towns, etc.* — Concluded

City or town	Somerville		Stoneham		Swampscott		Watertown		Winthrop		Metropolitan District	
Population	104,150		10,110		10,420		35,380		16,890		1,389,610	
Month	Gallons		Gallons		Gallons		Gallons		Gallons		Gallons	
	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita	Per Day	Per Capita
January	8,501,900	82	645,500	64	562,800	55	2,091,800	61	1,054,100	63	134,468,000	97
February	8,592,100	83	667,800	67	588,900	57	2,064,400	60	1,057,600	63	136,130,200	98
March	8,496,300	82	602,100	60	558,700	54	1,985,800	57	1,031,500	61	131,902,000	95
April	7,985,500	77	595,800	59	607,700	59	1,998,400	57	1,020,200	61	128,205,600	93
May	8,620,900	83	636,700	63	951,900	92	2,020,000	58	1,111,200	66	132,208,000	95
June	10,017,100	96	742,800	74	1,096,900	105	2,182,500	62	1,377,500	82	143,190,000	103
July	10,048,300	96	747,100	74	1,113,800	107	2,237,700	63	1,479,800	88	143,153,000	103
August	10,218,200	98	749,200	74	1,083,700	104	2,201,400	62	1,468,700	87	140,437,500	101
September	10,855,400	104	827,500	82	1,060,400	101	2,488,000	70	1,334,700	79	146,288,200	105
October	10,003,400	96	739,900	73	816,800	78	2,412,700	68	1,202,400	71	136,839,500	98
November	9,574,600	92	676,100	67	659,900	63	2,256,400	63	1,173,800	69	132,264,200	95
December	9,554,400	91	654,400	64	618,800	59	2,076,200	58	1,159,200	68	132,022,800	95
For the year	9,376,200	90	690,400	68	811,300	78	2,168,100	61	1,206,900	71	136,416,500	98

TABLE No. 10. — *Chemical Examinations of Water from the Wachusett Reservoir, Clinton—1930*

[Parts per 100,000]

Date of Collection	Appearance		Odor		Residue on Evaporation		Ammonia				Chlorine	Hardness
								Albuminoid				
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	Total.	Dissolved	Suspended		
Jan. 7	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	4.20	1.80	.0022	.0124	.0090	.0034	.31	1.3
Jan. 21	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.55	1.10	.0014	.0058	.0044	.0014	.32	1.3
Feb. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	2.85	1.25	.0014	.0080	.0050	.0030	.26	1.3
Feb. 18	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.40	1.40	.0014	.0074	.0048	.0026	.24	1.3
Mar. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.00	1.15	.0012	.0082	.0060	.0022	.25	1.3
Mar. 18	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	3.50	1.00	.0004	.0072	.0052	.0020	.25	1.3
Apr. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.40	1.15	.0012	.0072	.0044	.0028	.27	1.3
Apr. 22	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.10	1.10	.0004	.0072	.0056	.0016	.26	1.3
May 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.10	1.35	.0012	.0074	.0058	.0016	.29	1.3
May 20	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.60	1.20	.0020	.0070	.0054	.0016	.27	0.8
June 3	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.65	1.90	.0006	.0084	.0066	.0018	.28	0.8
June 17	V. slight.	Slight.	Faintly vegetable.	Faintly vegetable.	3.60	1.25	.0026	.0072	.0062	.0010	.29	0.6
July 8	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.35	1.05	.0004	.0060	.0038	.0022	.28	1.1
July 22	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.75	1.45	.0016	.0080	.0058	.0022	.30	1.0
Aug. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.85	1.15	.0016	.0068	.0056	.0012	.31	1.3
Aug. 19	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.45	1.00	.0008	.0080	.0054	.0026	.30	1.3
Sept. 9	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.50	1.05	.0020	.0072	.0052	.0020	.33	1.3
Sept. 23	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.85	1.50	.0022	.0060	.0050	.0010	.30	1.7
Oct. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.85	1.35	.0016	.0126	.0108	.0018	.29	1.8
Oct. 21	V. slight.	Slight.	V. faintly vegetable.	Faintly vegetable.	4.20	1.25	.0024	.0074	.0054	.0020	.25	1.0
Nov. 4	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.75	1.20	.0014	.0090	.0078	.0012	.29	1.1
Nov. 18	None.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	5.00	1.85	.0008	.0074	.0060	.0014	.33	1.0
Dec. 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.00	1.35	.0004	.0084	.0072	.0012	.29	1.4
Average	.....	.....	.....	.....	3.67	1.30	.0014	.0078	.0059	.0019	.29	1.2

TABLE No. 11. — *Chemical Examinations of Water from the Sudbury Reservoir—1930*

[Parts per 100,000]

DATE OF COLLECTION	APPEARANCE		ODOR		RESIDUE on EVAPORATION		AMMONIA				CHLORINE	HARDNESS
								ALBUMINOID				
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	Total	Dissolved	Suspended		
Jan. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.65	1.45	.0018	.0084	.0072	.0012	.28	1.3
Feb. 4	V. slight.	V. slight.	Faintly vegetable.	Faintly sweetish.	3.70	1.35	.0014	.0084	.0054	.0030	.30	1.7
Mar. 4	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	2.95	1.40	.0012	.0062	.0054	.0008	.27	1.3
Apr. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.60	1.65	.0014	.0082	.0050	.0032	.31	1.7
May 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.15	1.10	.0024	.0088	.0068	.0020	.33	1.3
June 3	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.85	1.35	.0006	.0064	.0038	.0026	.35	0.8
July 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.95	1.20	.0008	.0106	.0056	.0050	.31	1.3
Aug. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.15	1.05	.0018	.0068	.0052	.0016	.32	1.3
Sept. 9	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.15	1.20	.0008	.0078	.0054	.0024	.29	1.3
Oct. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.50	1.00	.0018	.0100	.0068	.0032	.36	2.1
Nov. 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.10	1.65	.0008	.0074	.0060	.0014	.33	0.8
Dec. 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.30	1.35	.0012	.0094	.0068	.0026	.34	1.1
Average	.....	.....	.....	.....	3.67	1.31	.0013	.0082	.0058	.0024	.32	1.3

TABLE No. 12 — *Chemical Examinations of Water from Spot Pond, Stoneham—1930*

[Parts per 100,000]

Jan. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.95	1.60	.0004	.0086	.0068	.0018	.26	1.3
Feb. 3	V. slight.	V. slight.	Faintly vegetable.	Dist. vegetable.	3.65	1.00	.0004	.0058	.0044	.0014	.28	1.3
Mar. 3	V. slight.	V. slight.	V. faintly fishy.	Faintly fishy.	7.10	1.60	.0016	.0062	.0052	.0010	.36	1.3
Apr. 7	V. slight.	V. slight.	Faintly vegetable and sweetish	Faintly veg. and sweetish.	3.00	1.05	.0018	.0072	.0042	.0030	.28	1.3
May 5	Slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.50	1.45	.0012	.0096	.0062	.0034	.28	1.7
June 2	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.45	1.15	.0020	.0084	.0066	.0018	.32	1.3
July 7	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	3.80	1.55	.0016	.0072	.0052	.0020	.30	1.3
Aug. 4	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	3.80	1.10	.0014	.0080	.0070	.0010	.33	1.3
Sept. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.55	1.00	.0008	.0096	.0064	.0032	.36	1.6
Oct. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.15	1.25	.0022	.0118	.0072	.0046	.34	1.8
Nov. 3	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	4.65	1.70	.0012	.0082	.0070	.0012	.31	1.0
Dec. 1	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	4.60	1.80	.0006	.0096	.0066	.0030	.32	1.4
Average	.....	.....	.....	.....	4.18	1.35	.0013	.0084	.0061	.0023	.31	1.4

TABLE No. 13. — *Chemical Examinations of Water from Lake Cochituate—1930*

[Parts per 100,000]

Date of Collection	Appearance		Odor		Residue on Evaporation		Ammonia				Chlorine	Hardness
								Albuminoid				
	Turbidity	Sediment	Cold	Hot	Total	Loss on Ignition	Free	Total	Dissolved	Suspended		
Jan. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.50	2.90	.0036	.0146	.0126	.0020	.84	3 0
Feb. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	8.05	2.00	.0034	.0126	.0100	.0026	.89	3.0
Mar. 5	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	7.80	2.35	.0090	.0118	.0108	.0010	.88	3.0
Mar. 5	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	7.40	1.80	.0026	.0110	.0084	.0026	.88	3.0
Apr. 9	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.75	2.15	.0022	.0110	.0084	.0026	.85	3.0
May 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.50	2.60	.0032	.0102	.0066	.0036	.85	3.0
June 4	V. slight.	V. slight.	V. faintly vegetable.	V. faintly vegetable.	7.45	1.95	.0022	.0140	.0104	.0036	.96	2.6
July 7	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	7.60	2.55	.0014	.0116	.0096	.0020	.91	2.9
Aug. 6	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.45	1.90	.0012	.0104	.0076	.0028	.96	2.9
Sept. 10	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	6.95	1.50	.0012	.0110	.0082	.0028	.94	3.0
Oct. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	7.80	2.05	.0004	.0184	.0126	.0058	.96	3 5
Nov. 5	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	7.70	2.30	.0080	.0128	.0094	.0034	.94	2.9
Dec. 3	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	8.55	2.25	.0072	.0122	.0090	.0032	.93	3.3
Average	.....	.....	.....	.....	7.65	2.18	.0035	.0124	.0095	.0029	.91	3.0

TABLE No. 14. — *Chemical Examinations of Water from a Tap at the State House, Boston—1930*

[Parts per 100,000.]

Jan. 13	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	5.20	1.75	.0022	.0082	.0070	.0012	.31	1.3
Feb. 3	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	3.70	1.25	.0008	.0062	.0046	.0016	.28	0.8
Mar. 3	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.55	1.05	.0012	.0048	.0036	.0012	.30	1.3
Apr. 7	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.80	1.50	.0028	.0068	.0058	.0010	.34	1.6
May 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.40	1.25	.0012	.0090	.0060	.0030	.34	1.3
June 4	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.60	1.45	.0012	.0064	.0052	.0012	.34	1.3
Aug. 4	Slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.20	1.45	.0012	.0062	.0050	.0012	.36	1.6
Sept. 8	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	3.60	1.00	.0006	.0078	.0056	.0022	.40	1.7
Nov. 5	V. slight.	V. slight.	V. faintly vegetable.	Faintly vegetable.	4.00	1.50	.0004	.0072	.0060	.0012	.33	1.0
Dec. 1	V. slight.	V. slight.	Faintly vegetable.	Faintly vegetable.	3.60	1.15	.0006	.0088	.0062	.0026	.36	1.1
Average	.....	.....	.....	.....	4.07	1.34	.0012	.0071	.0055	.0016	.34	1.3

TABLE No. 15. — *Chemical Examinations of Water from a Tap in Boston, 1898–1930*

[Parts per 100,000]

Year	Color	Residue on Evaporation		Ammonia				Chlorine	Oxygen Consumed	Hardness
					Albuminoid					
	Platinum Standard	Total	Loss on Ignition	Free	Total	Dissolved	Suspended			
1898	.40	4.19	1.60	.0008	.0152	.0136	.0016	.29	.44	1.4
1899	.28	3.70	1.30	.0006	.0136	.0122	.0014	.24	.35	1.1
1900	.29	3.80	1.20	.0012	.0157	.0139	.0018	.25	.38	1.3
1901	.29	4.43	1.64	.0013	.0158	.0142	.0016	.30	.42	1.7
1902	.30	3.93	1.56	.0016	.0139	.0119	.0020	.29	.40	1.3
1903	.29	3.98	1.50	.0013	.0125	.0110	.0015	.30	.39	1.5
1904	.23	3.93	1.59	.0023	.0139	.0121	.0018	.34	.37	1.5
1905	.24	3.86	1.59	.0020	.0145	.0124	.0021	.35	.35	1.4
1906	.24	3.86	1.39	.0018	.0159	.0134	.0025	.34	.36	1.3
1907	.22	3.83	1.40	.0013	.0129	.0109	.0020	.33	.32	1.3
1908	.19	3.50	1.35	.0011	.0115	.0092	.0024	.33	.26	1.2
1909	.18	3.46	1.43	.0011	.0128	.0103	.0025	.28	.25	1.3
1910	.14	3.05	1.24	.0013	.0118	.0102	.0016	.28	.22	1.1
1911	.25	4.18	1.66	.0015	.0156	.0128	.0029	.38	.33	1.4
1912	.17	3.86	1.23	.0018	.0154	.0119	.0034	.36	.29	1.7
1913	.13	3.96	1.15	.0014	.0150	.0120	.0026	.35	.26	1.5
1914	.14	4.12	1.19	.0014	.0138	.0116	.0022	.39	.25	1.4
1915	.16	3.73	1.04	.0015	.0157	.0134	.0023	.38	.25	1.4
1916	.18	4.53	1.85	.0013	.0133	.0107	.0026	.36	–	1.4
1917	.15	4.45	1.68	.0015	.0142	.0124	.0018	.33	–	1.3
1918	.18	3.89	1.45	.0019	.0154	.0128	.0026	.29	–	1.4
1919	.20	4.28	1.41	.0010	.0130	.0108	.0022	.36	–	1.5
1920	.17	4.23	1.35	.0012	.0112	.0097	.0014	.33	–	1.5
1921	.13	3.80	1.39	.0006	.0104	.0089	.0015	.25	–	1.4
1922	.16	3.98	1.55	.0011	.0097	.0080	.0017	.30	–	1.8
1923	.15	3.90	1.45	.0011	.0100	.0090	.0010	.26	–	1.5
1924	.12	4.10	1.60	.0011	.0109	.0084	.0025	.28	–	1.5
1925	.09	3.98	1.62	.0013	.0109	.0093	.0016	.29	–	1.5
1926	.10	4.18	1.68	.0015	.0115	.0092	.0023	.32	–	1.5
1927	.22	4.47	1.62	.0013	.0111	.0101	.0018	.34	–	1.9
1928	.27	4.43	1.72	.0011	.0124	.0106	.0018	.37	–	1.5
1929	.21	4.26	1.71	.0007	.0106	.0074	.0032	.30	–	1.3
1930	.16	4.07	1.34	.0012	.0071	.0055	.0016	.34	–	1.3

TABLE No. 16. — *Number of Bacteria per Cubic Centimeter in Water from Various Parts of the Metropolitan Water Works, 1898–1930.* (*Averages of Weekly Determinations.*)

Year	Chestnut Hill Reservoir			Southern Service Taps	
	Sudbury Aqueduct Terminal Chamber	Cochituate Aqueduct	Effluent Gate-house No. 2	Low Service, 182 Boylston Street	High Service, 1 Ashburton Place
1898	207	145	111	96	–
1899	224	104	217	117	123
1900	248	113	256	188	181
1901	225	149	169	162	168
1902	203	168	121	164	246
1903	76	120	96	126	243
1904	347	172	220	176	355
1905	495	396	489	231	442
1906	231	145	246	154	261
1907	147	246	118	130	176
1908	162	138	137	136	148
1909	198	229	119	150	195
1910	216	–	180	178	213
1911	205	204	151	175	197
1912	429	450	227	249	259
1913	123	243	157	119	140
1914	288	–	252	174	220
1915	163	–	128	117	134
1916	128	–	85	102	105
1917	178	112	119	119	141
1918	1,163	168	705	317	544
1919	92	85	100	70	84
1920	148	86	108	113	112
1921	103	–	83	92	92
1922	163	–	153	160	172
1923	229	–	178	217	230
1924	137	–	96	150	160
1925	144	251	120	155	174
1926	167	–	118	130	137
1927	119	185	70	81	101
1928	144	32	86	106	106
1929	128	–	84	130	144
1930	107	–	66	105	123

TABLE No. 17. — *Colors of Water from Various Parts of the Metropolitan Water Works in 1930. (Averages of Weekly Determinations.)*

[Platinum Standard]

Month	Wachusett Reservoir						Sudbury Reservoir				Framingham Reservoir No. 3	Lake Cochituate			Chestnut Hill Reservoir			Spot Pond	Fells Reservoir	Northern Service		Southern Service	
	Surface	Mid-depth	Bottom	Worcester St. Bridge	Quinapoxet River	Stillwater River	Surface	Mid-depth	Bottom	End of Open Channel	Mid-depth	Surface	Mid-depth	Bottom	Inlet (Sudbury Aqueduct)	Inlet (Cochituate Aqueduct)	Effluent Gate-house No. 2	Mid-depth	Effluent Gate-house	Tap at Glenwood Yard, Medford (Low Service)	Tap at Glenwood Yard, Medford (High Service)	Tap at 182 Boylston Street, Boston (Low Service)	Tap at 1 Ashburton Place, Boston (High Service)
January	16	16	16	36	30	21	18	18	18	17	17	19	19	19	17	–	16	–	14	17	14	17	17
February	15	15	15	34	32	20	17	17	17	16	17	18	19	23	17	–	15	14	14	16	14	16	16
March	16	16	17	37	41	26	18	19	18	19	18	19	19	19	18	–	16	13	13	16	14	16	16
April	16	16	16	34	43	31	19	19	19	21	19	19	19	19	22	–	17	13	13	18	13	18	18
May	16	17	17	39	53	35	19	19	19	18	20	18	18	32	23	–	19	14	14	19	14	19	19
June	16	–	16	41	46	31	19	19	–	19	–	17	18	48	24	–	20	–	14	19	14	20	20
July	16	16	16	36	75	43	17	18	19	17	19	15	18	125	22	–	19	15	15	18	15	19	19
August	15	15	16	25	55	31	17	17	18	16	18	16	21	114	22	–	19	15	16	16	16	17	17
September	14	15	17	35	70	26	16	15	17	15	16	15	21	147	20	–	17	15	16	16	15	18	18
October	11	11	12	17	64	25	13	13	12	12	12	14	17	135	14	–	12	13	12	13	12	13	13
November	10	10	10	44	76	38	10	10	10	24	12	16	19	43	12	–	10	9	9	11	10	11	11
December	10	10	10	34	41	26	15	15	13	26	11	16	16	17	13	–	11	10	9	11	10	11	11
Mean	14	14	15	34	52	29	17	17	16	18	16	17	19	62	19	–	16	13	13	16	13	16	16

TABLE No. 18. — *Temperatures of Water from Various Parts of the Metropolitan Water Works in 1930. (Averages of Weekly Determinations.)*

[The temperatures are taken at the same places and times as the samples for microscopical examination; the depth at place of observation is from high-water mark.]
[Degrees Fahrenheit.]

Month	Wachusett[1] Reservoir (Depth at Place of Observation 107 Feet)			Sudbury[1] Reservoir (Depth at Place of Observation 54.5 feet)			Wachusett Aqueduct	Framingham[1] Reservoir No. 3 (Depth at Place of Observation 20.5 Feet)			Lake Cochituate[1] (Depth at Place of Observation 62.0 Feet)			Chestnut Hill Reservoir	Spot Pond[1] (Depth at Place of Observation 28.0 Feet)			Northern Service		Southern Service	
	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	End of Open Channel	Surface	Mid-depth	Bottom	Surface	Mid-depth	Bottom	Effluent Gate-house No. 2	Surface	Mid-depth	Bottom	Tap at Glenwood Yard, Medford (Low Service)	Tap at Glenwood Yard, Medford (High Service)	Tap at 182 Boylston Street, Boston (Low Service)	Tap at 1 Ashburton Place, Boston (High Service)
January	34.0	–	35.0	36.0	36.8	37.5	34.3	36.2	37.7	37.0	34.9	35.0	37.0	36.0	33.4	–	34.5	38.5	39.3	38.7	39.1
February	34.8	35.3	35.6	33.8	36.0	36.5	34.6	35.1	36.7	37.0	34.7	35.2	36.1	37.8	34.9	34.8	35.5	37.6	39.3	38.7	39.7
March	36.3	36.3	36.4	37.6	37.8	38.0	37.1	38.3	38.5	38.3	38.6	38.3	38.0	38.4	37.3	38.0	37.5	40.8	41.3	40.4	40.9
April	41.5	40.7	41.7	44.6	44.5	43.6	42.8	46.2	48.3	43.0	45.2	43.9	43.1	46.6	44.7	46.8	45.3	47.3	46.3	46.7	48.5
May	54.5	56.0	50.2	59.3	57.0	56.3	51.8	60.4	60.3	58.9	59.8	51.7	48.6	58.0	58.1	59.5	55.8	59.3	57.4	58.9	60.0
June	60.2	–	57.0	60.0	59.5	–	57.0	63.5	–	60.8	63.3	53.8	48.0	58.0	59.5	–	59.0	59.0	59.0	59.8	59.5
July	71.7	58.7	61.1	74.2	72.5	65.3	67.2	74.1	75.3	73.6	74.7	56.9	51.3	73.2	74.0	73.5	–	74.2	70.8	74.1	74.5
August	72.0	64.2	64.1	72.9	73.3	70.3	67.1	72.8	74.0	71.1	73.3	59.2	52.6	71.3	72.3	71.5	72.5	72.8	71.1	73.8	73.5
September	69.3	62.3	60.4	70.1	69.0	68.5	65.8	71.3	70.4	69.5	70.0	56.7	52.7	69.7	69.6	68.8	69.3	70.9	69.8	70.9	71.1
October	58.2	54.8	59.2	58.3	60.5	58.3	55.9	55.7	55.3	55.5	57.1	54.3	49.5	57.8	59.4	61.0	56.7	61.3	61.9	60.4	60.5
November	48.2	47.3	48.6	46.3	46.5	46.8	46.0	45.6	44.4	46.3	47.9	47.7	46.9	47.2	47.0	48.0	46.0	51.0	51.4	49.9	50.2
December	38.6	38.3	38.0	36.4	37.3	36.8	39.3	35.2	35.0	37.4	38.0	39.6	39.8	39.0	37.4	37.5	38.5	41.5	42.9	41.9	41.5
Mean	51.6	49.4	48.9	52.5	52.5	46.5	49.9	52.9	52.4	52.4	53.1	47.7	45.3	52.8	52.3	53.9	50.1	54.5	54.2	54.5	54.9

[1] Surface temperatures are averages of weekly determinations. Mid-depth and bottom temperatures are averages of biweekly determinations.

TABLE NO. 19. — *Length of Metropolitan Water Works Main Lines and Connections and Number of Valves set in Same, Dec. 31, 1930*

[Pipes are of cast iron unless otherwise noted.]

	Diameter of Pipes in Inches																		Total
	60	56	54	48	42	40	38	36	30	24	20	16	14	12	10	8	6	4	
Total length owned and operated Dec. 31, 1929 (feet)	86,002	17,569	13,486	217,649	10,869	6,887	7,274	64,016	77,939	96,077	102,369	76,617	26	29,581	3,867	1,912	1,280	60	813.480
Gate valves in same	15	–	5	59	3	3	–	71	50	69	64	120	1	140	22	25	26	2	675
Air valves in same	116	8	12	132	6	5	6	48	46	55	66	41	–	10	1	–	–	–	552
Length laid or relaid during 1930 (feet)	5,363	–	–	50	9	–	–	–	2	5,503	12,377	1,354	–	89	–	9	17	–	24,773
Gate valves in same	1	–	–	–	–	–	–	–	–	2	10	11	–	7	–	–	–	–	31
Air valves in same	7	–	–	–	–	–	–	–	–	5	10	–	–	–	–	–	–	–	22
Length abandoned during 1930 (feet)	–	–	–	12	9	–	–	–	–	9	–	5	–	140	–	4	–	–	179
Gate valves in same	–	–	–	–	–	–	–	–	–	–	–	–	–	5	–	–	–	–	5
Air valves in same	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Length owned and operated Dec. 31, 1930 (feet)	91,365[1]	17,569[2]	13,486[2]	217,687[3]	10,869[4]	6,887	7,274[2]	64,016[5]	77,941[6]	101,571[7]	114,746[8]	77,966[9]	26	29,530[10]	3,867	1,917	1,297	60	838,074[11]
Gate valves in same	16	–	5	59	3	3	–	71	50	71	74	131	1	142	22	25	26	2	701
Air valves in same	123	8	12	132	6	5	6	48	46	60	76	41	–	10	1	–	–	–	574

[1] Includes 2,035 feet of 76-inch concrete-lined pressure tunnel; 363 feet of 76-inch mortar-lined and concrete-covered steel pipe; 21 feet of 76-inch cast-iron pipe; 85 feet of 60-inch concrete-covered steel pipe, and 44,018 feet of 60-inch steel pipe.

[2] Steel pipe.

[3] Includes 2,087 feet of steel pipe.

[4] Includes 1,059 feet of steel pipe.

[5] Includes 22 feet of steel pipe.

[6] Includes 15,512 feet of mortar-lined and covered wrought-iron pipe; 7,213 feet of cement-lined cast-iron pipe, and 18,997 feet of steel pipe.

[7] Includes 90 feet of steel pipe.

[8] Includes 1,319 feet of cement-lined cast-iron pipe.

[9] Includes 1,795 feet of cement-lined cast-iron pipe.

[10] Includes 627 feet of cement-lined cast-iron pipe.

[11] 158.73 miles.

TABLE No. 20. — *Length of Metropolitan Water Works Hydrant, Blow-off and Drain Pipes, Dec. 31, 1930*

[All pipes are of cast iron.]

	Diameter of Pipes in Inches								Total
	24	20	16	12	10	8	6	4	
Total length in use Dec. 31, 1929 (feet)	352	292	3,701	7,099	220	1,314	4,160	1,640	18,778
Valves in same	–	–	47	116	2	20	99	48	332
Length laid or relaid in 1930 (feet)	–	–	31	29	–	–	312	23	395
Valves in same	–	–	1	1	–	–	10	–	12
Length abandoned in 1930 (feet)	–	–	–	–	–	–	–	–	–
Valves in same	–	–	–	–	–	–	–	–	–
Total length in use Dec. 31, 1930 (feet)	352	292	3,732	7,128	220	1,314	4,472	1,663	19,173[1]
Valves in same	–	–	48	117	2	20	109	48	344

[1] 3.63 miles.

TABLE NO. 21. — *Length of Metropolitan Water Works Main Lines and Connections and Water Pipes, Four Inches in Diameter and Larger, in the Several Cities and Towns in the Metropolitan Water District, Dec. 31, 1930*

By Whom Owned	Inches																			Totals	
	60	56	54	48	42	40	38	36	30	24	20	18	16	14	12	10	8	6	4	Feet	Miles
Met. Water Wks.	91,365	17,569	13,486	217,687	10,869	6,887	7,274	64,016	77,941	101,571	114,746	–	77,966	26	29,530	3,867	1,917	1,297	60	838,074	158.73
Arlington	–	–	–	–	–	–	–	–	–	–	–	–	1,535	–	40,016	36,547	71,963	255,361	5,086	410,508	77.75
Belmont	–	–	–	–	–	–	–	–	–	–	–	–	–	–	11,445	26,980	54,440	197,304	269	290,438	55.01
Boston	–	–	–	20,600	15,980	16,081	–	43,780	90,543	84,641	86,582	–	298,395	5,041	1,671,299	447,533	1,055,000	1,091,506	79,573	5,006,554	948.21
Brookline	–	–	–	–	–	–	–	–	–	10,007	27,292	–	20,057	13,020	64,045	83,269	99,471	275,345	–	592,506	112.22
Chelsea	–	–	–	–	–	–	–	–	–	–	3,700	–	5,176	–	5,479	40,251	34,415	152,706	6,747	248,474	47.06
Everett	–	–	–	–	–	–	–	–	–	2,484	2,900	–	6,948	6,619	8,306	47,616	31,642	173,076	28,101	307,692	58.28
Lexington	–	–	–	–	–	–	–	–	–	–	–	–	2,590	–	26,567	11,776	52,330	184,135	27,890	305,288	57.82
Malden	–	–	–	–	–	–	–	–	–	–	–	–	8,891	11,118	94,511	37,047	111,558	234,676	48,945	546,746	103.55
Medford	–	–	–	–	–	–	–	–	–	–	673	–	6,775	9,598	41,256	45,091	130,459	278,658	21,159	533,669	101.07
Melrose	–	–	–	–	–	–	–	–	–	–	–	–	5,223	3,024	24,680	24,769	26,953	200,408	52,832	337,889	63.99
Milton	–	–	–	–	–	–	–	–	–	–	–	–	3,415	72	49,368	23,980	77,738	215,076	17,158	386,807	73.26
Nahant	–	–	–	–	–	–	–	–	–	–	–	–	–	10,444	5,550	11,550	8,870	37,942	57,668	132,024	25.00
Newton	–	–	–	–	–	–	–	–	–	–	36,250	–	3,120	–	85,710	7,400	168,090	667,895	58,380	1,026,845	194.48
Quincy	–	–	–	–	–	–	–	–	–	–	15,450	–	32,123	–	77,053	84,924	237,914	450,009	69,536	967,009	183.14
Revere	–	–	–	–	–	–	–	–	–	–	–	–	10,600	7,416	39,343	34,093	64,591	144,279	58,925	359,247	68.04
Somerville	–	–	–	–	–	–	–	–	–	–	5,577	367	10,094	7,942	113,118	69,111	113,396	217,702	18,746	556,053	105.31
Stoneham	–	–	–	–	–	–	–	–	–	–	–	–	–	–	10,725	175	5,110	132,484	19,887	168,381	31.89
Swampscott	–	–	–	–	–	–	–	–	–	–	–	–	–	3,721	6,714	21,800	7,375	115,889	7,366	162,875	30.85
Watertown	–	–	–	–	–	–	–	–	–	–	–	–	2,991	11,372	7,628	36,467	78,436	176,458	5,912	319,264	60.47
Winthrop	–	–	–	–	–	–	–	–	–	–	408	–	2,132	–	4,049	24,198	67,188	57,849	29,673	185,497	35.13
Total feet	91,365	17,569	13,486	238,287	26,849	22,968	7,274	107,796	168,484	198,703	293,578	367	498,031	89,413	2,416,392	1,118,444	2,498,856	5,260,065	613,913	13,681,840	–
Total miles	17.30	3.33	2.55	45.13	5.09	4.35	1.38	20.42	31.91	37.63	55.60	.07	94.32	16.93	457.65	211.83	473.27	996.23	116.27	–	2,591.26

TABLE NO. 22. — *Number of Service Pipes, Meters, Per Cent of Services Metered, Fire Services and Fire Hydrants in the Several Cities and Towns in the Metropolitan Water District, December 31, 1930*

CITY OR TOWN	Services	Meters	Per Cent of Services Metered	Services Used for Fire Purposes Only	Fire Hydrants
Arlington	6,847	6,847	100.00	37	815
Belmont	4,177	4,177	100.00	12	449
Boston	99,891	99,891	100.00	3,071	11,743
Chelsea	5,846	5,846	100.00	138	446
Everett	7,318	7,318	100.00	49	611
Lexington	2,342	2,342	100.00	6	432
Malden	9,654	9,638	99.83	76	705
Medford	10,534	10,534	100.00	30	1,009
Melrose	5,772	5,772	100.00	25	461
Milton	3,981	3,981	100.00	3	627
Nahant	900	900	100.00	2	124
Quincy	16,839	16,293	96.76	49	1,712
Revere	6,315	6,286	99.54	9	463
Somerville	14,126	13,970	98.90	120	1,380
Stoneham	2,350	2,337	99.45	3	180
Swampscott	2,673	2,673	100.00	5	279
Watertown	5,978	5,978	100.00	38	610
Winthrop	3,769	3,769	100.00	7	374
District Supplied	209,312	208,552	99.64	3,680	22,420
Brookline	7,677	7,677	100.00	33	947
Newton	14,500	14,500	100.00	100	1,435
Total District	231,489	230,729	99.67	3,813	24,802

TABLE NO. 23. — *Elevation of the Hydraulic Grade Line, in Feet, above Boston City Base for Each Month at Stations on Metropolitan Water Works during 1930*

1930 MONTH	LOW SERVICE																SOUTHERN HIGH SERVICE			
	WATERTOWN WATER WORKS OFFICE, MAIN STREET		BELMONT WATER WORKS SHOP, WAVERLEY STREET		BOSTON, 43 HAWKINS STREET		ALLSTON, ENGINE HOUSE, HARVARD STREET		MEDFORD NEAR MYSTIC RESERVOIR		SOMERVILLE PUBLIC LIBRARY, HIGHLAND AVENUE		MALDEN WATER WORKS SHOP, GREEN STREET		CHELSEA COURT HOUSE		BOSTON METROPOLITAN WATER WORKS, OFFICE 1 ASHBURTON PLACE		QUINCY, FORBES HILL TOWER	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
January	191	180	186	163	152	143	186	163	171	158	167	153	163	156	158	139	245	217	240	219
February	194	180	192	169	152	143	186	163	167	157	168	153	163	155	158	143	245	220	240	222
March	194	180	185	175	156	144	187	164	167	155	167	153	163	156	158	142	245	217	240	222
April	194	175	183	176	154	144	189	166	167	155	167	154	163	154	161	144	245	215	241	222
May	191	177	184	174	156	143	186	163	167	154	167	153	163	153	158	143	244	211	240	211
June	189	175	185	162	155	143	189	166	167	158	167	157	163	156	160	139	244	209	240	204
July	191	173	187	163	147	140	189	167	168	158	168	155	164	156	158	139	241	211	240	215
August	191	177	186	171	150	136	189	164	171	161	169	157	163	155	158	139	241	211	240	210
September	189	175	185	169	147	138	190	163	–[1]	–	168	154	163	151	158	139	243	211	–[1]	–
October	191	175	183	175	150	138	187	164	171	158	167	154	160	151	160	142	243	215	239	211
November	191	173	–[1]	–	150	140	186	163	171	159	167	153	160	151	160	139	244	220	239	220
December	197	180	186	171	145	136	186	166	169	155	168	153	158	153	162	139	244	220	239	218
Averages	192	177	186	170	151	141	188	164	169	157	168	154	162	154	159	141	244	215	240	216

[1] Out of order.

TABLE No. 23. — *Elevation of the Hydraulic Grade Line, in Feet, above Boston City Base, etc.* — Concluded

1930 MONTH	SOUTHERN HIGH SERVICE —Concluded		NORTHERN HIGH SERVICE									
	QUINCY WATER WORKS SHOP		SOMERVILLE WATER WORKS SHOP		MALDEN CITY HALL		REVERE WATER WORKS SHOP, BROADWAY		LYNN ENGINE HOUSE, UNION SQUARE		WINTHROP TOWN HALL, HERMAN STREET	
	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Minimum
January	235	207	263	252	269	260	267	258	266	252	191	165
February	235	205	263	254	269	262	267	255	266	238	191	165
March	233	202	261	233	269	262	267	255	266	245	194	165
April	233	202	261	243	269	262	267	247	266	241	196	161
May	230	186	268	233	269	262	267	255	266	231	196	152
June	235	186	258	219	268	258	267	246	265	196	200	130
July	235	193	256	222	268	258	267	248	263	195	187	136
August	235	189	256	217	269	255	267	241	261	196	187	129
September	237	198	260	233	268	251	267	251	263	213	196	170
October	237	204	263	240	265	251	265	251	263	226	197	180
November	235	207	263	237	265	260	265	259	263	236	198	182
December	239	209	263	243	265	260	265	258	263	233	198	187
Averages	235	199	261	236	268	258	267	252	264	225	194	160

Appendix No. 4

Contracts made and pending during

Contracts relating to the

	1 Number of Contract	2 Work	3 Number of Bids	Amount of Bid 4 Next to Lowest	Amount of Bid 5 Lowest	6 Contractor
1	33[2]	Furnishing and installing new staybolts in three vertical boilers at East Boston Pumping Station.	6	$5,580 00	$4,050 00[1]	International Engineering Works, Inc., Framingham, Mass.

Contracts relating to the

1	32	Furnishing labor and material for making borings, New Neponset Valley Sewer, South Metropolitan System, in Milton.	3	$1.10 per lin. ft.	$0.95[1] per lin. ft.	Edward P. Healey, Roxbury, Mass.
2	34[2]	Section 107, New Neponset Valley Sewer, South Metropolitan System, in Milton.	11	$117,800 00	$99,040 00[1]	V. Barletta Co., Roslindale, Mass.
3	35[2]	Section 108, New Neponset Valley Sewer, South Metropolitan System, in Milton.	17	113,236 50	108,105 00[1]	Frank W. Christy, Providence, R. I.
4	36[2]	Section 109, New Neponset Valley Sewer, South Metropolitan System, in Milton.	17	199,700 00	195,700 00[1]	V. Barletta Co., Roslindale, Mass.
5	37[2]	Section 110, New Neponset Valley Sewer, South Metropolitan System, in Milton.	12	218,040 00	187,735 00[1]	J. H. Ferguson Co., Providence, R. I.
6	38	Section 111, New Neponset Valley Sewer, South Metropolitan System, in Milton and Canton.	12	152,667 50	149,675 00[1]	Frank W. Christy, Providence, R. I.
7	39	Section 112, New Neponset Valley Sewer, South Metropolitan System, in Canton.	11	155,100 00	149,147 50[1]	C. & R. Construction Co., Boston, Mass.

[1] Contract based upon this bid. [2] Contract completed.

Appendix No. 4

the Year 1930. — Sewerage Division

North Metropolitan System

7 Date of Contract	8 Date of Completion of Work	9 Prices of Principal Items of Contracts made in 1930	10 Value of Work done Dec. 31, 1930	
May 16, 1929	Jan. 21, 1930	– – –	$8,100 00[3]	1

South Metropolitan System

Apr. 4, 1929	–	– – –	$14,325 36[4]	1
Aug. 1, 1929	Oct. 25, 1930	– – –	112,705 98	2
Sept. 5, 1929	Oct. 15, 1930	– – –	134,441 31	3
Dec. 5, 1929	Nov. 15, 1930[5]	– – –	78,800 24	4
Feb. 6, 1930	Sept. 30, 1930[5]	For excavation and refilling in trench for 72-inch by 75-inch concrete sewer, $29.50 per lin. ft.; for excavation of earth, or rock or both and refilling in tunnel for 72-inch by 75-inch concrete and brick sewer, $46 per linear ft.; for Portland cement brick masonry in manholes and special structures in trench, $30 per cu. yd.; for Portland cement brick masonry in tunnel and tunnel shafts, $35 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $12 per cu. yd.; for Portland cement concrete masonry in tunnel and tunnel shafts, $15 per cu. yd.; for Portland cement boulder concrete masonry in trench and tunnel, $5.60 per cu. yd.; for rock excavation in trench, $5 per cu. yd.	28,258 08	5
Apr. 11, 1930	–	For excavating and refilling in trench for 54-inch by 60-inch concrete sewer, $12.50 per lin. ft.; for Portland cement brick masonry in manholes and special structures, $32.50 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $12 per cu. yd.; for Portland cement boulder concrete masonry in trench, $5 per cu. yd.; for rock excavation in trench, $1.50 per cu. yd.	96,970 00	6
Apr. 14, 1930	–	For excavation and refilling in trench, for 54-inch by 60-inch concrete sewer, $15.50 per lin. ft.; for Portland cement brick masonry in manholes and special structures, $37 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $9 per cu. yd.; for Portland cement boulder concrete masonry in trench, $5 per cu. yd.; for rock excavation in trench, $1.50 per cu. yd.	83,452 50	7

[3] Contract extended at same rate to cover three additional boilers at East Boston Pumping Station.
[4] Contract extended at same rate to cover additional borings in Canton, Stoughton, Norwood, Walpole, Braintree and Weymouth.
[5] Contract terminated by agreement.

Appendix No. 4

Contracts made and pending during the

Contracts relating to the

1	2	3	Amount of Bid		6
Number of Contract	Work	Number of Bids	4 Next to Lowest	5 Lowest	Contractor
40[2]	Removing two old and furnishing and placing two new vertical boilers at Ward Street Pumping Station.	4	$9,900 00	$9,432 00[1]	International Engineering Works, Inc., Framingham, Mass.
41	Section 113, New Neponset Valley Sewer, South Metropolitan System, in Canton.	10	124,900 00	121,750 00[1]	Anthony Baruffaldi, West Somerville, Mass.
42	Section 114, New Neponset Valley Sewer, South Metropolitan System, in Canton.	14	118,257 00	105,950 00[1]	V. Barletta Co., Roslindale, Mass.
43	Section 115, New Neponset Valley Sewer, South Metropolitan System, in Canton.	17	91,692 50	91,325 00[1]	A. D. Daddario, Boston, Mass.
36-A	Part of Section 109, New Neponset Valley Sewer, South Metropolitan System, in Milton	10	187,343 50	179,585 00[1]	V. Barletta Co., Roslindale, Mass.
37-A	Part of Section 110, New Neponset Valley Sewer, South Metropolitan System, in Milton.	8	247,568 00	225,704 00[1]	J. H. Ferguson Co., Providence, R. I.
44	Section 116, New Neponset Valley Sewer, South Metropolitan System, in Canton and Norwood.	14	76,290 00	71,770 00[1]	A. D. Daddario, Boston, Mass.

[1] Contract based upon this bid. [2] Contract completed.

Appendix No. 4

Year 1930.—Sewerage Division.—Continued

South Metropolitan System.—Continued

7 Date of Contract	8 Date of Completion of Work	9 Prices of Principal Items of Contracts made in 1930	10 Value of Work done Dec. 31, 1930	
July 3, 1930	Nov. 5, 1930	For furnishing all material and constructing and erecting, ready for connecting two 93-inch vertical internally fired boilers.	$9,432 00	8
June 19, 1930	–	For excavation and refilling in trench for 54-inch by 60-inch concrete sewer, $15.50 per lin. ft.; for Portland cement brick masonry in manholes and special structures, $30 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $6 per cu. yd.; for Portland cement boulder concrete masonry in trench, $2 per cu. yd.; for spruce piles in trench in place, $0.25 per lin. ft.; for rock excavation in trench, $1.50 per cu. yd.	84,152 50	9
Oct. 23, 1930	–	For excavation and refilling in trench for 54-inch by 60-inch concrete sewer, $8 per lin. ft.; for Portland cement brick masonry in manholes and special structures, $30 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $8 per cu. yd.; for Portland cement boulder concrete masonry in trench, $2 per cu. yd.; for rock excavation in trench, $5 per cu. yd.	11,135 00	10
Oct. 16, 1930	–	For excavation and refilling in trench for 54-inch by 60-inch concrete sewer, $6.50 per lin. ft.; for excation and refilling in trench for 33-inch by 36-inch concrete sewer, $6.50 per lin. ft.; for Portland cement brick masonry in manholes, bellmouth, and special structures, $30 per cu. yd.; for Portland cement concrete masonry in trench, bellmouth, and special structures, $9 per cu. yd.; for Portland cement boulder concrete masonry in trench, $8 per cu. yd.	18,330 00	11
Nov. 13, 1930	–	For excavation and refilling in trench for 72-inch by 75-inch concrete sewer, $45 per lin. ft.; for excavation of rock or earth or both and refilling of tunnel for 72-inch by 75-inch concrete and brick sewer, $45 per lin. ft.; for Portland cement brick masonry in manholes and special structures in trench, $25 per cu. yd.; for Portland cement brick masonry in tunnel and tunnel shafts, $25 per cu. yd.; for Portland cement concrete masonry in trench for sewer and special structures, $10 per cu. yd.; for Portland cement concrete masonry in tunnel and tunnel shafts, $10 per cu. yd.; for Portland cement boulder concrete masonry in trench and tunnel, $2 per cu. yd.; for rock excavation in trench, $2 per cu. yd.	–	12
Nov. 13, 1930	–	For excavation and refilling in trench or tunnel for 72-inch by 75-inch concrete sewer, $57.70 per lin. ft.; for excavating and refilling in trench or tunnel over uncompleted 72-inch by 75-inch concrete sewer, $21.70 per lin. ft. for Portland cement brick masonry in sewer, manholes, bellmouth and special structures in trench or tunnel, $16 per cu. yd.; for Portland cement concrete masonry in trench or tunnel for sewer, bellmouth, and special structures, $14.70 per cu. yd.; for Portland cement boulder concrete masonry in trench or tunnel, $4 per cu. yd.	–	13
Dec. 24, 1930		For excavation and refilling in trench for 48-inch by 51-inch concrete sewer, $4 per lin. ft.; for excavation and refilling in trench and laying of pipe for 36-inch cast-iron pipe siphon, $20 per lin. ft.; for Portland cement brick masonry in manholes, headhouses and special structures, $30 per cu. yd.; for Portland cement concrete masonry in trench for sewer, siphon and special structures, $9 per cu. yd.; for Portland cement boulder concrete masonry in trench for sewer and siphon, $9 per cu. yd.; for rock excavation in trench, $5 per cu. yd.	–	14

Contracts made and pending during the Year 1930 — Sewerage Division — Concluded

Summary of Contracts

	Value of Work done Dec. 31, 1930
North Metropolitan System, 1 Contract	$8,100 00
South Metropolitan System, 14 Contracts	672,002 97
Total of 15 contracts made and pending during the year 1930	$680,102 97

(Cretin)

Stack Room 1935